

JOINT EVENT

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**The therapeutic effect of rat olfactory ensheathing cell transplantation on posttraumatic cysts of the spinal cord**Stepanova O V<sup>1</sup>, Voronova A D<sup>1</sup>, Valikhov M P<sup>1</sup>, Chadin A V<sup>1</sup>, Reshetov I V<sup>2</sup> and Chekhonin V P<sup>1</sup><sup>1</sup>V Serbsky National Medical Research Center for Psychiatry and Narcology, Russia<sup>2</sup>I M Sechenov First Moscow State Medical University, Russia

**Statement of the Problem:** The pathological processes developing after spinal cord injuries often result in the formation of cysts. Treatment of posttraumatic spinal cord cysts is a difficult task, and the existing surgical and medical methods are ineffective. One of the most promising and emerging trends is cell therapy. The most perspective type of cells may be the ensheathing cells of the olfactory mucosa. However, the therapeutic effect of these cells on posttraumatic cysts of the spinal cord remains unexplored. The purpose of this research is to study the therapeutic effect of rat olfactory ensheathing cell transplantation on posttraumatic cysts of the spinal cord.

**Methodology & Theoretical Orientation:** The ensheathing cells were obtained from rat olfactory mucosa by our modified procedure and were characterized by the expression of markers p75NTR and GFAP detected by immunofluorescence method. The study of the therapeutic effect of the transplantation on posttraumatic cysts was conducted on a model developed in our laboratory. The formation of cysts was confirmed by MRI. The cells were transplanted in different amounts (750000, 1500000). The dynamic of the recovery of motor activity of the hind limbs of rats was assessed using the BBB test.

**Findings:** The improvement of the motor activity after transplantation of the olfactory ensheathing cells into posttraumatic cysts was demonstrated. The necessary number of cells (1.5 million) for the transplantation was also established, and a neuroprotective effect of a given number of cells was revealed.

**Conclusion & Significance:** For the first time the therapeutic effect of rat olfactory ensheathing cell transplantation on posttraumatic cysts was demonstrated. Further research in this area will help to develop a combined use of the cell therapy by olfactory ensheathing cells with surgical and drug therapy for the treatment of patients with posttraumatic cysts of the spinal cord.

**Recent Publications**

1. Zhang C, Douglas P, Feng S, Abakumov M A, Gubsky I L, Chekhonin V P, Morozova A Y and Bryukhovetskiy A S (2015) Precise delivery into chronic spinal cord injury syringomyelic cysts with magnetic nanoparticles MRI visualization. *Medical Science Monitor* 21:3179-3185.
2. Zhang C, Feng S, Douglas P, Chekhonin V P and Hu N (2016) Letter to the editor regarding "local versus distal transplantation of human neural stem cells following chronic spinal cord injury" by Cheng et al. *The Spine Journal* 16(6):792-793.
3. Abakumov M A, Semkina A S, Green M A, Majouga A G and Chekhonin V P (2016) Optical and computed tomography of small laboratory animals in a modern preclinical studies. *Biomedical Photonics* 5(1):18.
4. Voronova A D, Stepanova O V, Chadin A V, Reshetov I V and Chekhonin V P (2016) The cell therapy in traumatic spinal cord injury. *Vestn. Ross. Akad. Med. Nauk.* 71(6):420-426.
5. Voronova A D, Stepanova O V, Valikhov M P, Chadin A V, Dvornikov A S, Reshetov I V and Chekhonin V P (2018) Preparation of human olfactory ensheathing cells for the therapy of spinal cord injuries. *Bulletin of Experimental Biology and Medicine* 164(4):523-527.

**Biography**

Stepanova O V works in the field of the Regenerative Medicine. She studies the resident stem/progenitor cardiac and neural cells. She demonstrated that the heart of the patients with heart failure due to dilated cardiomyopathy contains the progenitor resident cardiomyocytes and dedifferentiated cardiomyocytes. These cardiac cells possibly can proliferate and differentiate to mature cardiomyocytes and recover heart function and structure after injury. She found that myosin activating protein kinases may contribute in myofibril formation during the cardiomyocyte differentiation. Now she is actively working in the field of investigation of olfactory mucosa neural stem/progenitor and ensheathing cells. Development of methods for obtaining the cell cultures from the olfactory mucosa and the study of the therapeutic efficacy of these cells in experimental posttraumatic spinal cord cysts will create the preconditions for their successful application in the treatment of patients with posttraumatic cysts of spinal cord.

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