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Authors: Khaustova M. M., Lukyanova E. M.

THE INFLUENCE OF APPLYING STEM CELLS ON THE RNA CONTENT IN PROCESSES OF NEURONS OF CEREBRUM ON THE EXPERIMENTAL NITRITE MODEL OF ALZHEIMER'S DISEASE

Kharkiv National Medical University, department of pathological anatomy and department of pathological physiology, Kharkiv, Ukraine

Supervisors: Prof. MD Hubina-Vakulick H. I.

The Alzheimer's disease stays a common illness among old people. According to The Alzheimer's Association an estimated 6.5 million Americans age 65 and older are living with Alzheimer's dementia in 2022. The percentage of this disease in 2022 year is: 5% of people age 65-74, 13,1% of people age 75-84, and 33,2% of people age 85 and older have Alzheimer's dementia. The treatment of it is ineffective and the disease progresses.

It has been proven in an animal experiment that the introduction of a single dose of stem cells to animals with a formed AD model leads to the proliferation of endotheliocytes and an increase in the number of capillaries in the brain tissue (Lukyanova, 2021, 2022). It can be assumed that against this background, positive changes should occur in the cytoplasm of the processes of nerve cells, where pathological changes are observed during the formation of an amyloid plaque.

Aim of investigation. To assess the degree of regeneration of RNA-containing structures in the cytoplasm of nerve cell processes due to the injection of stem cells in rats with a nitrite model of Alzheimer's disease.

Materials and methods. The rats were distributed into 3 groups. The 1st – intact group (gr.C, n=3), the 2nd group – under a sodium nitrite impact every day during 28 days (gr.N, n=4), the 3rd group – under a sodium nitrite impact every day during 28 days + dose of stem cells on 29th day (gr.NS, n=4) The animals were withdrawn from the experiment on the 32nd day. (Lukyanova. E., 2019,2020,2021,2022)

Using histochemical stain for nucleic acids (Einarson's method with hallocyonine) morphometric determination of the RNA content in the cytoplasm of the processes of nerve cells was carried out by cytophotometry method (Tashke, 2015). On each micropreparation, the brightness of the color of the processes cytoplasm of nerve cells was measured in 20 areas. Statistical processing of the results was carried out according to Student.

Results. Microscopically, amyloid plaques were found in gr.N and gr.NS in the white matter of the cerebral hemispheres. Amyloid angiopathy is also present. The network of processes of nerve cells (neuropile) is partially preserved. The preserved neuropil looks rarer.

During the two weeks of the regeneration period in animals of gr.N, the content of RNA in the cytoplasm of the processes of nerve cells did not normalize, but remained lower than in gr.C, because the optical density of the cytoplasm in Einarson micropreparations is consistently lower than in gr.C ($0,0645 \pm 0,0030$ un.opt.dens – gr.N and $0,0882 \pm 0,0044$ un.opt.dens – gr C.). And in gr.NS, the neuropil became more dense. The content of RNA in the cytoplasm of the processes of nerve cells increased, because optical density of the cytoplasm increased almost to the control level (gr.NS - 0.0840 ± 0.042 un.opt.dens.).

Conclusion. A nitrite experimental model of Alzheimer's disease has shown that the use of stem cells for treatment can be effective, because in connection with the improvement of the capillary network, a more intensive restoration of the processes of nerve cells is observed with an increase in the amount of RNA, and, therefore, an increase in protein synthesis.

Group B

Chairman: Sushetska Daryna

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(Department of Internal Medicine No.2, Clinical Immunology and Allergology named after academician L.T. Malaya, Kharkiv National Medical University)

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(Department of General and Clinical Pathological Physiology named after D.O. Alpern, Kharkiv National Medical University)

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DISCUSSION SCIENTIFIC JURY