CHANGES IN THE FUNCTIONAL STATE OF GLIOMA CELLS UNDER THE INFLUE NCE OF ETHANOL AND MELDONIUM

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Introduction:

Gliomas are one of the most malignant neoplasms in the human body.[1] Today there are several hypotheses of glial cell proliferation and glioma formation. One of the main is the theory that neuronal stem cells, which were under strict control, lost it,as a result the process of malignancy begin.

The danger of gliomas is due to the difficulty of their therapy, both medical and surgical. In this regard, a large number of scientific groups are focused on finding new ways and drug compounds that will allow targeted destruction of glioma cells without surgery.

Taking into account the presence of the blood-brain barrier among the considered drug candidates, the compounds whose chemical properties will allow to penetrate this barrier without hindrance have the greatest potential

The aim of our study was to study the effect of a number of BBB-permeable compounds on some metabolic characteristics of glioma cells.

At first, human glioma lines[2] were cultured in DMEM during the day, then Meldonium[3] was added at a concentration of 1 μg / ml and incubated for 24 hours (37°C, 5% CO2). To another group of glioma cells, ethyl alcohol was added at a concentration of 10% and also incubated for 24 hours with the same conditions

Mitochondrial membrane potential was detected by laser scanning confocal microscope. To do this, the mitochondria in cells stained with tetramethylrhodamine at a concentration of 40 nM incubated for 40 minutes (37°C, 5% CO2). TMRM-accumulated in mitochondria depending on their membrane potential and was excited at a wavelength of 543 nm, the potential was recorded at a wavelength in the range of 560 – 570 nm. On each Petri dish with the inhibitor substance (Meldonium) 5 zones with the brightest fluorescence were found. Then, using the Z-stacks method on the laser scanning confocal microscope LSM 780 (Carl ZEISS)[4], total fluorescence from mitochondrial membranes was obtained from these cells and the state of membrane potential was assessed. Statistical processing of the results was carried out by the method of non-parametric statistics with the calculation of the Mann-Whitney criterion.

Results:

Glioma cells after the addition of Mildronate increased mitochondrial membrane potential by approximately 5-10% without a statistically significant difference. When alcohol was added, the ethyl potential on the membrane decreased by 60% (statistically significant).

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