Axotomy induce an increase in the expression of pro-apoptotic proteins Pink1, Parkin and Cofilin in the dorsal root ganglia

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Background and aims

To assess changes in the level and localization of the proapoptotic proteins Pink1, Parkin, and Cofilin in rat dorsal root ganglia 24 hours after axotomy, we used the method of immunohistochemistry. To form an experimental model of axotomy, we dissected the rat sciatic nerve. As a control, we examined the ganglia of the intact nerve on the other side of the animal.

Results

It was demonstrated that in dorsal root ganglia, the proteins Pink1, Parkin, and Cofilin are localized in the cytoplasm of neurons. Their average level in the cytoplasm was significantly higher than the level in the nuclei. 24 hours after transection of the sciatic nerve, the mean level of Pink1, Parkin, and Cofilin proteins in the cytoplasm of neurons in the axotomized ganglion increased compared to the control.

Conclusions

The Pink1 / Parkin protein system is responsible for mitochondrial quality control. An increase in the expression of Pink1 and Parkin indicates that axotomy entails severe disturbances in the functioning of the mitochondrial network of neurons. Cofilin regulates the remodeling of the actin cytoskeleton by depolymerizing fibrillar actin during shape changes, cell movement, and endocytosis. Increased expression of Cofilin indicates that disruption of axon integrity triggers disassembly of actin filaments in the soma of neurons of dorsal root ganglia. This work was supported by the Ministry of Science and Higher Education of the Russian Federation (grant No. 0852-2020-0028).