

Immunohistochemical research of reaction of motoneurons of lumbar spinal cord of the mice that were in 30-day flight on the BION-M1 biosatellite on a week readaptation to conditions of Earth gravitation

Tyapkina O., Rezvyakov P., Nurullin L., Petrov K., Nikolskiy E., Islamov R.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016, Human Stem Cell Institute. All rights reserved. Earlier, by an immunohistochemical method we define that after 30-day space flight in motoneurons of mice lumbar spinal cord immunoexpression of the proteins responsible for synaptic transfer of a nervous impulse and proteins of heat shock proteins decrease. In this research for an assessment of animals recovery process dynamics after space flight we studied an immunoexpression of the proteins participating in synaptic transfer of a nervous impulse (synaptophysine, and PSD95), neurotrophic factors (a vascular endothelial factor of growth - VEGF and its receptor - Flt-1) and heat shock proteins (Hsp25 and Hsp70) in motoneurons of lumbar spinal cord of a mice after 30-day space flight on the BION-M1 biosatellite and the subsequent week readaptation to conditions of Earth gravitation. In this research by immunohistochemical method determine that after a week of animals staying in the Earth gravitation conditions the immunoexpression of synaptophysine continued to decrease while the expression of PSD95, Hsp25, Hsp70 and VEGF increased in relation to the animals removed from experiment right after 30-day flight. The obtained data confirm functional plasticity of spinal cord motoneurons in the conditions of gravitation force changing. The fact, which is especially interesting, that "switches on" of neurons protective mechanisms (strengthening of heat shock proteins and neurotrophic factor expression) happens not in response to hypogravitation influence, but only a week after return of animals to conditions of Earth gravitation.

Keywords

Heat shock proteins, Hypogravitational motor syndrome, Motoneurons, Space flight, Spinal cord, Synaptic transfer proteins