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Author: Dr. Irina Ogneva
SSC RF Institute of bio-medical problems RAS, Russian Federation, iogneva@yandex.ru

Mr. Vasily Gnyubkin
France, vasily.gnyubkin@univ-st-etienne.fr
Mr. Norbert Laroche
France, norbert.laroche@univ-st-etienne.fr
Ms. Maria Maximova
Russian Federation, mary.v.maximova@gmail.com
Mrs. Irina Larina
Institute for Biomedical Problems, Russian Federation, irina.larina@gmail.com
Dr. Laurence Vico
France, vico@univ-st-etienne.fr

STRUCTURE OF THE CORTICAL CYTOSKELETON OF CARDIOMYOCYTES OF MICE AFTER 30-DAY 2G-CENTRIFUGATION

Abstract

Altered external mechanical loading during spaceflights causes negative effects on muscular and cardiovascular systems. We tested the hypothesis that the different isoforms of alpha-actinins dissociate from cortical cytoskeleton under increased/decreased of mechanical load. The state of the cortical cytoskeleton in C57BL6J mice left ventricle cardiomyocytes was investigated after 30-day 2g-centrifugation ("2g" group) and within 12 hours after its completion ("2g+12h" group). We used atomic force microscopy for estimating cell's transverse stiffness, western-blotting for measuring protein content, and RT-PCR – for estimating their expression level. The transverse stiffness significantly decreased in cardiomyocytes (by 16 percent) in animals of "2g" group (as compared to the control group). In "2g+12h"group, the transverse stiffness significantly decreased in all investigated cell types (in comparison with the relevant values observed in "2g" group). For cardiomyocytes we found that in "2g+12h"group alpha-actinin-1 content decreased in the membranous fraction (by 27 percent) and increased in cytoplasmic fraction (by 28 percent) of proteins (in comparison with the levels in "2g" group).

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