

Springer Proceedings in Physics 154

Efstathios K. Polychroniadis
Ahmet Yavuz Oral
Mehmet Ozer *Editors*

International Multidisciplinary Microscopy Congress



Proceedings of InterM, Antalya, Turkey,
October 10–13, 2013

 Springer

International Multidisciplinary

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Chapter 31

Effect of Different Forms of Hypokinesia on the Ultrastructure of Limbic, Extrapyramidal and Neocortical Areas of the Rat Brain: Electron Microscopic Study

Mzia G. Zhvania, Nadezhda J. Japaridze and Mariam G. Ksovreli

Abstract The effect of chronic restraint stress and chronic hypokinesia “without stress” on the ultrastructure of central and lateral nuclei of amygdala, CA1 and CA3 area of the hippocampus, cingular cortex, nucleus caudatus and motor cortex of adult male rats were elucidated. In some neurons and synapses of abovementioned regions pathological modifications were revealed. More significant alterations provokes chronic restraint stress. Alterations are mostly concentrated: first—in the nuclei of amygdala, then in the CA1 and CA3 areas. Moderate alterations were observed in cingular cortex and nucleus caudatus. In comparing with it, hypokinesia “without stress” provokes only moderate modifications: predominantly in the nucleus caudatus, in lesser degree—in the hippocampus and amygdalae.

The ability of restraint motor activity (hypokinesia) to produce alterations on the functioning of central nervous system has been studied extensively. Numerous articles and reviews have been written on the reasons, mechanisms and possible consequences of such alterations [1–5]. However several questions still demand further elucidation. Especially limited work has been accomplished investigating the effect of various forms of chronic hypokinesia on the structure of brain [2, 6, 7]. It is very likely that depending on the form of hypokinesia, different brain structures could be involved in pathology. In the present study, using transmission electron microscope (TEM) we elucidated how different forms of restraint motor activity are reflected

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