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Effects of simulated microgravity on stereological parameters of motor cortex and hippocampus in male rats

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Background and Aim : Microgravity can cause sensorimotor and cognition dysfunction although its cellular and molecular mechanisms is not well understood. Therefore, the aims of the present study were to investigate stereological parameters of the brain areas involved in motion (motor cortex) and learning-memory (hippocampus) in simulated microgravity situation.

Methods : Sixteen rats divided into two groups: freely moving rats housed in 12:12 h light-dark cycle and hindlimb unloading rats housed in 12:12 h light-dark cycle. motor cortex (primary and secondary motor cortex) and hippocampus volumes; numerical density of entire motor cortex as well as its layers I, II-III, V, VI; CA1, CA3, dentate gyrus subregions of hippocampus and total motor cortex neurons have been estimated and these parameters compared between two groups. Statistical comparisons were made by t-test.

Results : Significant differences between groups were not observed.

Conclusion : microgravity may affect function of neurons in the motor cortex or hippocampus or affect stereological parameters/function of the other brain regions to induce its undesirable effects.

Keywords : Motor cortex, Hippocampus