COMBINED ACTION OF VIBRATION AND LOW-INTENSITY ELECTROMAGNETIC RADIATION ON SPIKE ACTIVITY OF SUPRAOPTIC CELLS

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In the frame of this investigation we have analyzed spontaneous spike activity of supraoptic cells of hypothalamus after 30-day-long exposure of low-intensity extremely high frequency radiation (EHFR) (42,2 GHz, 0,19 mW/cm^2, daily for an hour) on vibration-stimulated rats (60 Hz, 0,4 mm, 2-hour-long sessions daily). The analysis of spike activity of registered cells by the distributions of neurons by the degree of regularity, dynamic structure of neuronal streams and different frequency ranges, as well as the mean spike frequency and the coefficient of variation of interspike intervals (ISIs) in naive control and after treatment was carried out. The evaluation of reliability of changes in distributions of ISIs of supraoptic neurons after 30-day-long exposure to low-intensity EHFR on vibration-stressed rats compared with control was assessed by χ^2 test. Student's t-test was made to divulge statistically significant differences in changes of the mean spike frequency and the coefficient of variation of ISIs. Combined 30-day-long exposure to vibration and EHFR caused significant changes in the all investigated indices. Thus, we have revealed reliable ($P < 0.05$) shifts in the distribution of supraoptic neurons according to the degree of regularity of spike activity. They were manifested in 2.8-fold increase of the amount of cells with intermediate-regularity activity accompanied with decrease of numbers of irregular and non-stationary units (2.1- and 1.2-fold, respectively). As to regular cells they were not recorded after 30 days of combined action of factors. The above-described changes

were significant in comparison with isolated influence of vibration. Exposure to low-intensity EHFR on vibration-stimulated animals during 30 days was followed by significant ($p<0.01$) shifts in the distribution of supraoptic neurons according to dynamic structure of neuronal streams. We have observed substantial increase of quantity of neurons with coincident and monotonous changes in discharges frequency as well as 3-fold decrease in the proportion of burst/group neurons. The significant decrease of mean spike frequency up to 13.5±1.7 imp/s ($p<0.01$) was revealed after the 30-day influence of low-intensity EHFR on vibration-stimulated rats. It was accompanied by correspondingly reliable ($p<0.01$) changes in distribution by the different frequency ranges of stationary impulse flows. Thus, the abrupt increase of quantity of low-frequency cells as well as decrease of numbers of high- and medium-frequency units was noted. These changes were statistically insignificant in comparison with data from isolated action of vibration. The changes of the value of coefficient of variation of ISIs had a statistically reliable character after 30-day factors' influence: it was increased up to 105.3±4.3% ($p<0.05$). Thus, we suppose that the effect of EHFR depends on initial state of organism.