PECULIARITY OF GLIAL-NEURONAL INTERACTIONS IN NEOCORTEX OF RATS WITH DIFFERENT EPILEPTIC STATUS

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In the recent time, more neuroresearches are interested in brain disorders connected with human epilepsy and epileptic animals models (Novozhilova AP, Gaikova ON, 2002; Kalinichenko SG et al., 2004; Eidt S. et al., 2004). The present study was undertaken to provide an experimental explanation for known facts suggesting a development of reactive gliosis in head brain of subjects suffering from epilepsy.

Methods: We studied the glia-neuronal interrelations in different rat’s group: Wag/Rij rats genetically predisposed to non-convulsive absence-epilepsy and Wistar rats prone to convulsive audiogenic epilepsy. The control group was used Wistar rats without seizures after acoustic stimulation. The number of neuroglia and neurons was estimated in motor cortex of Wistar rats predisposed to convulsive audiogenic epilepsy and in motor neocortex of Wag/Rij rats predisposed to non-convulsive absence-epilepsy. The adult animals were placed into the box and treated by standard complex («multipeak») sound with a frequency range of 13—85 kHz and mean intensity 50—60 dB for 90 s. After two months of treating the rats with the intensity convulsive activity were decapitated, brain was fixed and frontal slices of forebrain were stained by Nissle method. A total 16 animals were studied.

Results: The density of neurons in brain of WAG/Rij rats was higher (24%) than in brain of Wistar rats (untreated group). There was no difference between the groups in density of glia in motor cortex, whereas the number of glia in corpus callosum of WAG/Rij rats was higher (26.9%) than in Wistar rats. There was no statistically significant variation in the number of neurons and satellite glia in brain of Wistar rats in either predisposed or resistant to convulsive audiogenic epilepsy (the treated group or untreated group). However the density of diffuse glia cells or «free» glia in audiogenic rats was greater (11%) than in untreated group. There was no difference in density of glia in corpus callosum.

Conclusions: The predisposition to epilepsy is correlated with increase in density of neuroglia in motor cortex (Wistar rats) and in corpus callosum (WAG/Rij rats). We suggest that gliosis in motor cortex precedes the epilepsy status and provides increased excitability for neurons, their readiness for synchronization of electrical activity due to increased axon myelinization.