SUMMARY

The presented work focuses on the animal models of schizophrenia. The general part is dedicated to describing histomorphological and biochemical changes in patients with schizophrenia and basic classification and description of animal models of schizophrenia. The results of 3 studies that deal with histomorphological, biochemical and behavioral abnormalities in the neurodevelopmental model of schizophrenia and in the pharmacological model of schizophrenia induced by the administration of substances that affect the serotonergic system are presented in the special part. In the study No. 1 we demonstrated that the early immune stimulation in rats leads in adulthood to changes in the brain and plasma levels of neurotransmitters and their metabolites, activation of kynurenine pathway of tryptophan metabolism, hypertrophy of astrocytes, reduction of hippocampal volume and decrease of tyrosinhydroxylase immunoreactivity in the substantia nigra pars compacta. The findings of this study support the hypothesis of an important pathophysiological role of the early immune stimulation in schizophrenia and other neuropsychiatric disorders. In the study No. 2 we verified the application of tryptamine (psilocin) and phenylethylamine (mescaline) hallucinogen as phenomenologically valid animal model of schizophrenia. Administration of the tested substances led to a deficit in the prepulse inhibition of the acoustic startle reaction and damage of the brain functional connectivity measured by quantitative EEG. These findings are very similar to the findings in patients with schizophrenia. In the study No. 3 the application of synthetic drug 4-bromo-2,5-dimethoxyphenylethylamine (2C-B) induced in animal model deficit in the prepulse inhibition of the acoustic startle reaction and time- and dose related biphasic changes in the locomotion when the hypolocomotion was followed by the hyperlocomotion. Low doses of 2C-B reduced the EEG power and coherence, high doses had a temporary biphasic effect with an initial decline followed by an increase in power – a similar effect was also observed in the coherence. Using the microdialysis we also demonstrated increased levels of dopamine and its metabolites homovanilic acid and 3-methoxytyramine and decreased levels of 3,4-dihydroxyphenylacetic acid in the nucleus accumbens. The increase in the EEG power and coherence was after the 2C-B application time associated with the increase in the locomotion and dopamine levels in the nucleus accumbens.