

ABSTRACT

The present work describes animal models of psychosis with the aim on monoamine levels and behavioral/EEG findings. The general part is focused on reporting biochemical and EEG findings in patients with schizophrenia, followed by animal models of schizophrenia and their EEG findings. In the special part, results of behavioral and EEG parameters in three animal models of psychosis are presented. A study by Palenicek et al, 2013 described serotonergic animal model and showed that 4-bromo-2,5-dimethoxyphenylethylamine (2C-B) induced deficit in prepulse inhibition of startle reaction and produced dose related biphasic changes in the locomotion (i.e. hypolocomotion was followed by the hyperlocomotion). Low doses of 2C-B decreased EEG power and coherence, while 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. In microdialysis study, increased levels of dopamine and its metabolites homovanilic acid and 3-methoxytyramine and decreased levels of 3,4-dihydroxyphenylacetic acid in the nucleus accumbens are described. The increase in the EEG power and coherence after the 2C-B application was associated with an increase in locomotion and congruently with elevated dopamine levels in the nucleus accumbens. Study by Palenicek et al, 2011 focused on pharmacokinetics of ketamine in rat brain tissue/sera and behavioral and EEG characteristics after a single injection of ketamine. The administration of ketamine led to a pronounced hyperlocomotion and to a deficit in prepulse inhibition of startle reaction. Our study proved dose-dependent changes in EEG parameters, where the lower dose induced robust and dose- and time-dependent increases in absolute EEG power in the delta and gamma bands, while the higher dose induced an increase in theta-to-beta power. Acute ketamine injection increased EEG coherence throughout the whole spectrum mostly pronounced after administration of the higher dose. Study by Fujakova et al, 2014 aimed on assessing the potential antipsychotic effect of agonist of metabotropic 2/3 glutamate receptor in ketamine animal model of psychosis. The mGlu2/3 agonist decreased ketamine-induced hyperlocomotion, but had no effect on prepulse inhibition of startle reaction. EEG analysis of epochs with behavioral inactivity revealed an increase in high frequency bands and a decrease in low-frequency bands. Further, such analysis showed a decrease in EEG coherence. All these alterations were partially normalized by mGlu2/3 agonist.