

ABSTRACT

The main aim of this study was to determine the changes in neuronal activity of anterior cingulate cortex (ACC), orbitofrontal cortex (OFC) and medial prefrontal cortex (MPC) in rats sensitized to D2/D3 receptor agonist quinpirole (QNP) during exploration of enriched open field arena. During the experiment, the evaluation of behavioural changes induced by quinpirole sensitization were also assessed and compared to previous results.

For the purpose of this study, twenty-two adult male Long-Evans rats were used. The half of the rats was sensitized to QNP by receiving daily subcutaneous injections of quinpirole (0,5 mg/kg) while the other half received saline. Both groups were habituated for ten days to open-field arena enriched with two metal objects. The behaviour of animals was videotaped and the data about locomotion and the number of visits of each locale was obtained. On the eleventh day, the part of saline and quinpirole treated groups explored the open-field arena ($t = 5$ min) while the other two subgroups were left as respective cage-controls. Immediately after the end of experiment, all rats were sacrificed, and the extracted brains were cryopreserved. To determine the changes in neuronal activity of selected brain regions, fluorescence *in situ* hybridization of immediate early gene *Arc* was performed on the brain tissue of sacrificed rats and the proportion of neurons expressing *Arc* mRNA were obtained.

In agreement with previous studies, QNP sensitization led to the significant increase of locomotion and the checking behaviour compared to controls. Quinpirole sensitized animals displayed temporally stable preference of locales. We observed a significant increase in proportion of *Arc* expressing neurons of OFC of QNP sensitized animals. These differences in expression of *Arc* in OFC were caused by high baseline expression of QNP sensitized cage-controls. There were no significant differences in proportions of *Arc* expressing neurons in MPC or ACC in QNP sensitized animals compared to controls. The significant changes rather than by elevated *Arc* expression during compulsive checking. The results of this study suggest quinpirole induced compulsive checking is not reflected in altered activity of OFC and ACC, structures implicated in OCD pathophysiology. The injection of QNP, however, increases the baseline activity of OFC neurons.

Key words: obsessive-compulsive disorder, quinpirole, neuroanatomic correlates, animal model, dopamine, *Arc*, immediate early genes (IEG), fluorescence *in situ* hybridization (FISH)