

Abstract:

Introduction: Methamphetamine is a drug frequently taken by drug-addicted pregnant women and happens to be one of the most commonly used drugs in the Czech Republic. This drug passes easily through a placental barrier into the fetus. Thus it can negatively affect not only the mother but also the prenatal development of her offspring.

Objectives: This research aims to provide a general screening of gene expression in selected regions of the F1 generation of the brain prenatally affected by methamphetamine, to verify whether exposure to methamphetamine affects the generation of offspring of exposed females at the level of gene expression in selected regions of the brain, and to evaluate possible changes in gene expression.

Methods: In selected parts of the brain, collected from a rat, the microarray hybridization and the real-time PCR were set to evaluate expression changes in the expression of selected genes.

Results: Statistical analysis of the microarray hybridization did not show a significantly altered gene expression in the tested genes. Only boundary values for 13 genes were measured, which were further tested by the real-time PCR. After a statistic evaluation of the real-time PCR, the significantly altered expression was found in 2 genes. The notably changed expression of *DRD3* and *TACR3* genes was found only in the striatum, but not in other parts of the brain. In the case of *FOXP2* gene a reduced expression in the prefrontal cortex was measured. We conclude that the prenatal exposure to drug without stress load of descendant does not lead to significant changes of gene expression in specific regions of the brain of an adult offspring. This project could contribute to a better understanding of the effect of methamphetamine on the development of the brain of the fetus and clarify the possible neuropsychological effects on a child prenatally exposed to methamphetamine.

Key words: Methamphetamine, striatum, prefrontal cortex, hippocampus, prenatal exposition, microarrays, real-time PCR