

Methamphetamine (MA) is a psychostimulant drug with high potential for abuse. Psychostimulants were shown to cause behavioral sensitization – a progressive increase of their psychomotor activating effects. Since half of MA users are women of reproductive age, there is an increased risk of negative consequences for their children.

The aim of my dissertation thesis was to find out whether prenatal MA exposure is able to increase sensitivity to the same drug in adulthood.

Pregnant dams were injected daily with MA 5 mg/kg or saline (S) subcutaneously (s.c.) during the whole gestation. The absolute control group of adult females (C) was not exposed to any injection application. To test the sensitivity of the offspring to MA in adulthood, half of each prenatally exposed group (MA, S, C) were administered MA 1 mg/kg while the other half received S s.c. The sensitizing effect of prenatal MA exposure was tested in the open field, elevated plus maze, Laboras (Metris B.V., Netherlands), Morris water maze, tail-flick test and in the tests of susceptibility to epileptic seizures.

Our results showed that the animals prenatally exposed to MA were more susceptible to flurothyl seizures and demonstrated better performance in the test of memory. On the other hand, acute MA application in adulthood increased motor activity, decreased anxiety to novel environment and heights, increased susceptibility to NMDA seizures, decreased susceptibility to flurothyl seizures and increased body temperature. In males acute MA application had also antinociceptive effect. In addition, chronic MA application in adulthood impaired performance in the test of learning, increased motivation and elicited behavioral sensitization. Regarding the sensitizing effect of prenatal MA exposure, we demonstrated that animals exposed to MA prenatally were more sensitive to psychostimulant, hypertermic and anticonvulsive effects of MA challenge in adulthood. In contrast, males prenatally exposed to MA were less sensitive to antinociceptive effect of MA challenge.

In conclusion, this thesis indicates that offspring of mothers abusing MA during pregnancy may be more susceptible to repeated MA administration or to neurotoxic effects of MA, when they encounter this drug later in life. Last but not least our study also showed new possibilities of research in the field of drug abuse.