



Short communication

Nitric oxide modulates the amphetamine effect on [³H]glucose uptake in the brain of rats prenatally exposed to lead

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Abstract:

Glucose is the main source of energy for the central nervous system (CNS). In this study, we examined the effects of the psychostimulant amphetamine (AMPH) and the neuronal mediator nitric oxide (NO) on [³H]glucose uptake in the brain of adult rats that had been prenatally exposed to lead. Lead [Pb(CH₃COO)₂ · 3H₂O; 250 ppm] was added to the drinking water of pregnant Wistar rats for the duration of pregnancy. On the day of parturition, lead was discontinued as an additive in the drinking water. Offspring remained with dams for 21 days. The control group consisted of rats that consumed water without lead. In adulthood, male offspring from both groups (lead-exposed and control) were pretreated with 7-nitroindazole (nNOS blocking agent) (10.0 mg/kg *ip*) or saline (1.0 ml/kg *ip*), 30 min before AMPH (1.0 mg/kg *ip*). After another 30 min, and 15 min before termination, all rats were injected with 6-[³H]-D-glucose (500 μCi/kg *ip*). Brain specimens were taken (striatum, frontal cortex, hippocampus, and thalamus with hypothalamus, and pons with medulla oblongata) for determination of radioactivity in a liquid scintillation counter. We found that lead did not alter [³H]glucose uptake in brain regions studied (with exception of frontal cortex) but that AMPH increased [³H]glucose uptake in the striatum, frontal cortex and hippocampus, and that the AMPH effect was lessened in the hippocampus of lead-exposed rats. Moreover, the AMPH effect on [³H]glucose uptake in the frontal cortex, hippocampus, thalamus with hypothalamus and pons of control rats was potentiated by 7-NI pretreatment. Similar effect was observed in lead-intoxicated rats (striatum, frontal cortex and hippocampus). These results indicate that NO modulates AMPH-induced [³H]glucose uptake in the brain of rats prenatally exposed to lead.

Key words:

lead, amphetamine, 7-nitroindazole, CNS, [³H]glucose, rats
