

LACK OF CHANGES IN CORTICAL [³H]-MUSCIMOL BINDING IN RATS SENSITIZED TO NICOTINE-INDUCED ENHANCEMENT OF DOPAMINE METABOLISM

*Halina Sienkiewicz-Jarosz¹, Agnieszka I. Członkowska²,
Małgorzata Lehner³, Piotr Maciejak³, Marek Siemiątkowski⁴,
Janusz Szynkler², Aleksandra Wisłowska², Małgorzata Zienowicz²,
Andrzej Bidziński³, Wojciech Kostowski⁴, Adam Płaźnik^{2,3,#}*

¹Department of Neurology, ³Department of Neurochemistry, ⁴Department of Pharmacology and Physiology of the Nervous System, Institute of Psychiatry and Neurology, Sobieskiego 9, PL 02-957 Warszawa;

²Department of Experimental and Clinical Pharmacology, Medical University, Krakowskie Przedmieście 26/28, PL 00-927 Warszawa, Poland

Lack of changes in cortical [³H]-muscimol binding in rats sensitized to nicotine-induced enhancement of dopamine metabolism. H. SIENKIEWICZ-JAROSZ, A. I. CZŁONKOWSKA, M. LEHNER, P. MACIEJAK, M. SIEMIĄTKOWSKI, J. SZYNDLER, A. WISŁOWSKA, M. ZIENOWICZ, A. BIDZIŃSKI, W. KOSTOWSKI, A. PŁAŻNIK. Pol. J. Pharmacol., 2003, 55, 165–170.

It was proposed that chronic nicotine treatment may induce adaptive changes in GABA_A receptors, thus leading to the attenuation of a GABAergic inhibition of dopaminergic neurons. This putative mechanism might underlie the sensitization to nicotine-induced increase in locomotor activity and dopamine metabolism; i.e. phenomena highly significant to the dependence-producing effects of this psychostimulant. To test this hypothesis, in the present study we have analyzed the influence of acute and repeated treatment of rats with nicotine on the binding of a highly selective and competitive GABA_A receptor agonist, [³H]-muscimol. The binding was investigated by autoradiography in different brain cortical structures. It was found that nicotine given at the dose stimulating locomotor activity (0.6 mg/kg, *sc*), markedly increased striatal HVA concentration in the group of animals chronically pretreated (for 6 days) with this psychostimulant. Neither acute nor repeated nicotine administration changed in a significant way the [³H]-muscimol binding to brain cortical structures. Thus, the hypothesis about the role of adaptive changes in GABA_A receptors in the enhancement of the biochemical and behavioral effects of nicotine was not confirmed.

Key words: *nicotine, dopamine, [³H]muscimol, autoradiography, microdialysis, behavior, rat*