3837273 STNS/M : MAJOR : NEUROSCIENCE ; M.Sc. (NEUROSCIENCE)
KEY WORD : C-FOS PROTEIN / PSEUDOEPHEDRINE / DRUG ABUSE
NOOTCHANART CHAINORIT : THE STUDY OF TOLERANCE TO PSEUDOEPHEDRINE, AND THE COMPARISON OF CROSS TOLERANCE WITH AMPHETAMINE BY THE RESPONSE OF C-FOS PROTEIN IN THE RAT BRAIN. THESIS ADVISOR : STEFANO CASALOTTI, Ph.D., PIYARAT GOVITRAPONG, Ph. D., PONGCHAI HARNYUTTANAKORN, Ph.D., NAIPHINICH KOTCHABHAKDI, Ph.D. 125 p. ISBN 974-589-332-3

Pseudoephedrine is a drug commonly prescribed as a nasal decongestant and bronchodilators which is also freely available in cold remedies and medications. The structural and pharmacological similarities of pseudoephedrine to amphetamine has led to evaluation of its psychomotor stimulant properties within the central nervous system. Previous results have shown that, similarly to amphetamine and cocaine, acute administration of pseudoephedrine increased dopamine levels both in the stiatum and nucleus accumbens while chronic administration had the opposite effect. Pseudoephedrine inhibited the [^{3}H] dopamine uptake in striatum and nucleus accumbens synaptosomal preparations. In behavioral study pseudoephedrine produced a discriminative stimulus similar to that of amphetamine. Additionally, pseudoephedrine induced c-Fos expression in striatum and nucleus accumbens which was inhibited by SCH 23390, a specific D_1 dopamine receptor antagonist. In this study the effect of chronic administration of pseudoephedrine on the induction of c-Fos by this drug was investigated in detail using polyclonal antibodies against c-Fos protein in a Western blot assay. This work demonstrated that chronic exposure to pseudoephedrine reduced the c-Fos response to acute pseudoephedrine treatment suggesting that pseudoephedrine induced tolerance in the animals. At least 3 days were necessary for the full recovery of the pseudoephedrine-induced c-Fos induction. SCH 23390 reduced pseudoephedrine-induced c-fos expression with the same efficiency both in naive and chronically treated rats indicating that there is no change of signalling mechanisms in the chronically treated rats. C-Fos protein expression was not induced after withdrawal at 18 hours, 1 day, 2 days, 3 days and 5 days. Amphetamine and Pseudoephedrine were mutually substituted in the final injection of animals chronically treated with either of the two drugs and both resulted in the described reduced induction of c-Fos expression as compared to administration to naive animals. This indicates cross-tolerance for the two drugs suggesting that their mechanism of c-Fos induction employes common pathways.

This study has provided further evidence on the similarities of amphetamine and pseudoephedrine in their action on the central nervous system. Despite the considerably lower potency of pseudoephedrine, it should be investigated whether it may be abused by some individuals to substitute for the illegal use of amphetamine.