Antidepressant, and Antinociceptive Effects of Mirtazapine

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Abstract

This work was conducted to evaluate the effect of mirtazapine on norepinephrine (NE), Serotonin (5-HT), Dopamine (DA), and Acetylcholine (ACh.) in frontal cortex (F. C.) of rat’s brain in depression induced experimentally in rats to study its possible antidepressant mechanism. In addition, to evaluate its possible antinociceptive effect.

Results of the present work revealed that depression induced experimentally in rats resulted in significant reduction of NE, 5-HT, DA levels \( (P \leq 0.05) \) and elevation of A. Ch levels in F.C of rat’s brain. While mirtazapine \( (10 \text{ mg/kg I.P}) \) For 15 days, revealed significant elevation of NE, 5-HT, and DA Levels \( (P \leq 0.05) \), and reduction of A.Ch levels \( (P \leq 0.05) \) in F.C of rat’s brain.

Mirtazapine elicited an antinociceptive effect following doses \( (2.5, 5, 7.5 \text{ mg/kg I.P}) \), an action which was significantly reduced \( (P \leq 0.05) \) by both yohimbine \( (0.1 \text{ mg/kg I.P}) \) and mianserine \( (4 \text{ mg/kg I.P}) \) and was significantly inhibited \( (P \leq 0.05) \) by naloxone \( (1 \text{ mg/kg I.P}) \).

In conclusion: Depression induced experimentally in rats may be due to alterations in NE, 5-HT, and DA Levels with increased A.Ch concentration in F.C. of rat’s brain, while enhanced NE and 5-HT neurotransmission in F.C may underlie to the antidepressant effect of mirtazapine. The antinociceptive effect of mirtazapine is mainly influenced by opioid receptors combined with both serotonergic and noradrenergic receptors.

Introduction

Depressive disorders are serious illnesses, and a major public health problem (Ustum and Sartorius, 1993). The prefrontal cortex plays a crucial role in the higher brain functions such as working memory or cognition, and controls, via excitatory axons of pyramidal neurons, the activity of many