Sensitization to morphine-induced potentiation of brain stimulation reward: reversal by DNQX

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The experiments were performed using 2 groups of male albino rats with the monopolar electrodes implanted in medial forebrain bundle. Animals were trained to press a bar in a standard Skinner box to obtain the electrical stimulation. All animals received 7 daily injections of morphine 5 mg/kg (s.c) followed 50 min later by i.p. administration of either vehicle (2% Tween-80; group 1, n=8) or 6,7-dinitroquinoxaline-2,3-dione (DNQX, 100 mg/kg; group 2, n=7). Each self-stimulation session began 30 min after morphine injection. On day 7 morphine-induced increase in response rate, but not decrease of threshold current was more pronounced in group 1 than in group 2. Two weeks later the rats were exposed to the test injection of the same dose of morphine. The "sensitization" to morphine-induced alterations in response rate and threshold current intensity was observed in group 1, but not group 2. Additional control experiments failed to find any effect of both acute and chronic administration of DNQX on responding in the rats received either acute saline or acute morphine.

These results indicate that the chronic administration of morphine elicits long-term changes in the reward pathways which may be prevented by the concomitant administration of the antagonist of non-NMDA subtypes of glutamate receptors DNQX.

DISPOSITIONAL PREDICTORS OF INDIVIDUAL DIFFERENCES IN T-CELL FUNCTION AND CYTOKINE LEVELS

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In the present study, we examined the relations of state distress to T-cell function and in vivo cytokine levels in 40 male college freshman on two occasions. In addition, we assessed the possible contribution of dispositional determinants of distress to immune-related differences in mood. Relative to characteristically less anxious subjects, subjects who were characteristically more anxious (but subclinically anxious) had more anxious mood and had significantly lower lymphocyte proliferative responses to the mitogen Concanavalin A (Con A), as well as lower levels of circulating interleukin-1β. In addition, subjects with more negative attributional styles for bad events exhibited reduced Con A-stimulated T-cell responses and lower levels of circulating interleukin-2. Finally, subjects who were more depressed (but sub-clinically depressed) also had reduced blastogenic responses. Individual differences in cortisol and β-endorphin were not shown to mediate these relationships. The present study provides evidence that dispositionally-related variations in distress in psychiatrically healthy, relatively unstressed college males have immunological correlates that suggest altered T-cell and macrophage activity.

Monoaminergic Depletion and Changes in Aggressive Behavior in Cats and Rats

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The involvement of various neurotransmitters in aggressive behavior has been studied intensively for years. It is known that various neurotransmitter systems remain in anatomical and functional interactions and it seems that the changes in their dynamic balance might play an important role in the regulation of complex behaviors.

The purpose of our experiments was to study the behavioral and biochemical effects of the destruction of noradrenergic (NA) system in respect to various types of aggression in two different species.

In both, cats and rats the experimental paradigms were designed as close to the natural circumstances as it was possible in the laboratory, i.e. predatory behavior and predatory competition for cats, mouse-killing and intruder-resident with computerized ethological analysis for rats. The first series of tests allowed to describe the behavioral profile of all animals. Then submissive cats and rats were treated with selective noradrenergic neurotoxin DSP-4 preceded by zimelidine to protect 5HT neurons. After the completion of the experiments, concentration of NA, 5HT and DA (in case of rats also their metabolites) was measured in brain structures associated with emotional behavior. It has been found that DSP-4 treatment did not affect prey killing in either cats or rats. Also well established dominance-submissive order during predatory competition remained unchanged, except the situation when the stressful stimuli were presented to the pair of cats. In rats, marked decrease of defensive episodes and increase of offense during social interactions, were observed. Simultaneously it was found that DSP-4 treated rats explored more in stressogenic highly illuminated area than controls. Three possible hypotheses are discussed: 1. increase of aggression 2. fear reduction 3. inadequate responsiveness to environmental factors.

Biochemical analysis showed significant reduction of NA and some changes in 5HT and DA, which we consider as an effect secondary to NA depletion. In the neurochemical perspective the results obtained can be interpreted in terms of altered NA, 5HT and DA balance that reflects functional interactions within monoaminergic systems.