Chronic Morphine Treatment and Withdrawal Increase Extracellular Levels of Norepinephrine in the Rat Bed Nucleus of the Stria Terminalis

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Abstract

Extracellular levels of norepinephrine (NE) and glutamate (Glu) in the ventral bed nucleus of the stria terminalis (vBNST) of saline- and chronic morphine-treated rats, with or without withdrawal, were studied by means of the in vivo microdialysis technique in anesthetized rats. In addition, the tissue concentration of NE was studied at different rostrocaudal levels of the vBNST. Chronic morphine treatment significantly increased extracellular levels of NE, but not Glu, in vBNST. At 48 h after naloxone-induced morphine withdrawal there was a further significant increase in the extracellular levels of NE, but not Glu, in vBNST. The presence of UK 14304, an α_2-adrenergic agonist, induced a significant decrease in NE extracellular levels in all experimental groups. In contrast, UK 14304 induced a significant decrease in Glu extracellular levels only in saline-treated rats. The results also show that the vBNST presents a rostrocaudal gradient of NE and contains 9.4% of total brain NE. The increase in NE extracellular levels in vBNST induced by chronic morphine treatment and the further increase in NE levels 48 h after naloxone-induced morphine withdrawal suggest that NE in vBNST may be involved in the pharmacological effects of chronic morphine and withdrawal.