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Separate involvement of the spinal noradrenergic and serotonergic systems in morphine analgesia: the differences in mechanical and thermal algesic tests.

Kuraishi Y, Harada Y, Aratani S, Satoh M, Takagi H.

Experiments using 3 analgesic tests, the tail-pinch, hot-plate and tail-flick methods, were done to evaluate the roles of the spinal noradrenergic and serotonergic systems in the production of morphine analgesia in rats. To deplete noradrenaline or serotonin in the spinal cord, 6-hydroxydopamine or 5,6-dihydroxytryptamine was given intrathecally. 6-Hydroxydopamine suppressed the antinociceptive effects of morphine injected systemically or intracerebrally (into the nuclei reticularis gigantocellularis and paragigantocellularis or into the periaqueductal gray matter) in the tail-pinch test, but not significantly in the hot-plate and tail-flick tests. Conversely, 5,6-dihydroxytryptamine suppressed the antinociceptive effects of systemically given morphine in the hot-plate test, but not significantly in the tail-pinch and the tail-flick tests. The results not only provide further evidence for the involvement of the descending inhibitory systems in morphine antinociception, but also show that the extent of participation of the spinal noradrenergic and serotonergic systems in the effects of morphine has to be carefully assessed as different analgesic tests (tail-pinch, tail-flick and hot-plate) yield different results.