

제목	Differential actions of intracerebroventricular (ICV) opioid receptor agonists on the activity of dorsal horn neurons (DHN) in the cat spinal cord
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내용	<p>ICV infusion of morphine (MOR) produces strong analgesia in man and animals. The analgesic effect is thought to be mediated by the centrifugal inhibitory control. But neural mechanisms of the analgesic effect of ICV morphine are not well understood. For example, in the previous studies, ICV morphine does not inhibit nociceptive transmission in the spinal cord. On the contrary, ICV MOR often excites activity of dorsal horn neuron in the spinal cord. In the present study, we found that ICV MOR had dual actions on activity of dorsal horn neuron that it produced both inhibition and excitation of dorsal horn neurons. Since MOR exerts its action via three different types of opioid receptors, we further sought to investigate if there are differential effects of opioid receptor agonists on dorsal horn neurons when administered ICV.</p> <p>Thirty-six cats were anesthetized with alpha-chloralose (60mg/kg) and paralyzed with pancuronium bromide. Fifty-seven DHNs were recorded from the lower lumbar spinal cord. Only cells that were sensitive to noxious heat stimulation were studied. Majority of dorsal horn neurons were WDR (n=49). High threshold and low threshold neurons were 7 and 1 neurons, respectively. Noxious heat stimuli of 44, 46, 48 and 50°C were applied to the receptive field, and the excitatory responses of DHNs to the heat stimuli were compared before and after ICV administration of drugs. All drugs of 50µl in volume were infused slowly to the 3rd ventricle or the cerebral aqueduct.</p> <p>Effects of ICV MOR were tested in 28 DHNs: ICV MOR (50µg) inhibited 4 neurons and excited 9 neurons. It, however, did not affect the heat responses of 15 DHNs. ICV MOR either suppressed or activated responses of cells to the heat stimuli in all range of intensity without affecting the slope of the heat intensity-response relationship. Effects of ICV DAMGO (5µg) were tested on 8 cells: heat responses of all but 2 cells were excited by the µ-agonist. Effects of ICV DADLE (10ug), a δ-agonist were tested on 9 cells: 3 cells were excited and 6 cells were not affected. In contrast, U-50488 (150ug), a κ-agonist, inhibited and excited 4 and 3 of 12 cells tested, respectively and 5 cells were not affected.</p> <p>The above results showed that opioid receptor agonists have different actions on activity of dorsal horn neuron. The inhibitory actions that κ-agonist has may subserve the analgesia often produced by ICV MOR.</p> <p>Key-Words : ICV, Morphine, Opioid agonists, Descending inhibition, Analgesia, Dorsal horn neuron, Spinal cord</p>