

Summary:

The cerebellum and its deep nuclei contribute to the regulation of specific functions including motor coordination, and pain. Histamine modulates some functions of the fastigial nucleus, such as motor coordination. However, the histamine receptor-mediated involvement of the fastigial nucleus, one of the deep cerebellar nuclei, in pain modulation has not yet been investigated. In this study, in a visceral nociception model in rats, the role of the fastigial nucleus histamine receptors in nociception and general locomotor activity and motor coordination was investigated by the intra-fastigial nucleus microinjections of histamine and its H₂ receptor's agonist and antagonist; a non-selective opioid receptor antagonist was also used to clarify opioid receptors' contribution. In order to deliver the microinjected drugs, the right and left sides of the fastigial nucleus were stereotaxically implanted with guide cannulas. Intraperitoneal acetic acid (1 mL, 1%) injection induced the visceral nociception, then the latency time to the first abdominal wall contraction was recorded and the number of abdominal wall contractions was counted over a 60-min period in 5-min time blocks. Open-field and rotarod tests were applied for general locomotor assessment and motor coordination, respectively. According to the results, intra-fastigial nucleus histamine and dimaprit (H₂ receptor agonist) increased first abdominal wall contraction onset latency, decreased the contractions number, and increased falling time from the rod. These effects were prevented by ranitidine (H₂ receptor antagonist) pre-treatment. Naloxone, with no effect on falling time from the rod, inhibited the antinociceptive effects of histamine and dimaprit. Beam break number was not affected by the above-mentioned treatments. Based on the results, it can be suggested that histamine H₂ receptor at the fastigial nucleus may have an inhibitory role in acetic acid-induced visceral pain and improve motor coordination. The histamine H₂ receptor antinociceptive function, but not motor coordination, might be mediated by fastigial nucleus opioid receptors.

Keywords: Cerebellar fastigial nucleus, histamine H₂ receptors, opioid receptors, visceral nociception, rats