Summary:

Ventral pallidum (VP) is a basal ganglia structure, which is involved in regulating the perception of pain and emotions. In this study, the nociceptive effects of intra-VP microinjection of histamine and its H_1 agonist (2-pyridylethylamine) and antagonist (mepyramine); and a non-selective opioid receptors' antagonist (naloxone) were investigated using a formalin-induced model of pain in rats. In order to deliver the study drugs, two guide cannulas were stereotaxically implanted in the right and left VP. On formalin test day, following the intra-VP microinjection of the test drugs, intraplantar (ipl) formalin (2.5%, 50 µl) injection was used to induce the pain, and then both the first and the second phases of licking/biting duration as well as flinching number were recorded for 60 minutes by observing the animal's behavior in a clear Plexiglas box. Intra-VP microinjection of histamine and 2-pyridylethylamine at the same doses of 0.25, 0.5, and 1 µg/200 nl reduced both the first and second phases of licking/biting duration as well as flinching number induced by the intraplantar injection of formalin. Pre-microinjection of mepyramine and naloxone at the same dose of 2 µg/200 nl into the VP antagonized the abovementioned suppressive effects of histamine and 2-pyridylethylamine on licking/biting and flinching behaviors. None of the treatments used in this study altered the animal's motor activity. Based on the results of this study, histamine and its activated H_1 receptor in the VP may have a role in the modulation of formalin-induced pain-related behaviors. Opioid receptors in the VP may be involved in the histaminergic processing of the pain-related behaviors.

Keywords: Ventral Pallidum; Histamine H_1 Receptor; Opioid Receptors; Formalin Pain; Rat