論 文 要 旨

Orexinergic descending inhibitory pathway mediates linalool odor-induced analgesia in mice

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Linalool odor exposure induces an analgesic effect in mice. This effect disappeared in the anosmic model mice, indicating that olfactory input evoked by linalool odor triggered this effect. Furthermore, hypothalamic orexinergic neurons play a pivotal role in this effect. However, the neuronal circuit mechanisms underlying this effect have not been fully addressed. In this study, we focused on the descending orexinergic projection to the spinal cord and examined whether this pathway contributes to the effect. We assessed the effect of intrathecal administration of orexin receptor antagonists on linalool odor-induced analgesia in the tail capsaicin test. We found that the selective orexin type 1 receptor antagonist, but not the selective orexin type 2 receptor antagonist, prevented the odor-induced analgesic effect. Furthermore, immunohistochemical analyses of c-Fos expression induced by the capsaicin test revealed that neuronal activity of spinal cord neurons was suppressed by linalool odor exposure, which was prevented by intrathecal administration of the orexin 1 receptor antagonist. These results indicate that linalool odor exposure drives the orexinergic descending pathway and suppresses nociceptive information flow at the spinal level.