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## The role of parabrachial GABA (A) receptors in chronic pain modulation in rats

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**Background & Objective:** The parabrachial nucleus is a critical link in the transmission of short latency nociceptive information to midbrain neurons. GABA(A) receptors have bidirectional roles in controlling nociception and are abundant in the parabrachial region. We examined the effects of bilateral intra parabrachial microinjection of different doses of the GABA(A) receptor agonist, muscimol, and the GABA(A) receptor antagonist, bicuculline, on pain modulation using a chronic pain test.

**Materials & Methods:** Rats were anaesthetized with sodium pentobarbital (55 mg/kg) and then special cannulas were inserted stereotaxically into the parabrachial nucleus. After 1 week of recovery, the effects of microinjection of muscimol, (62.5, 125, 250 ng/side) or bicuculline, (50, 100, 200 ng/side) into the parabrachial on formalin test were assessed. Formalin test were measured for 60 minutes after drug microinjection.

**Results:** Injection of Muscimol (62.5ng) per core compared to saline caused no significant change in pain. Injection of Muscimol (125ng) reduced the chronic pain than the dose 62.5 also did not change significantly. Muscimol injection of 250ng of each core, leads to more analgesia compared to controls was established ( $P < 0.001$ ) and the induced analgesia Muscimol injected dose of 250ng was statistically significant. In the second set of experiments, bicuculline (50, 100, 200ng/0.5 $\mu$ l saline, a selective GABA-A receptor antagonist), microinjected into the LPBN, on formalin-induced nociceptive behaviors, intra LPBN administration of 50, 100 and 200ng of bicuculline resulted in similar pain behaviors compared to the vehicle group in phase 1, interphase, or phase 2 with similar AUC ( $P > 0.05$  respectively).

**Conclusion:** The results of the present study showed that in this model of pain agonist GABA(A) receptors in the parabrachial region are endogenously activated.

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