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A NEURONAL PATHWAY FROM THE VENTRAL TUBEROMAMMILLARY NUCLEUS TO THE NUCLEUS OF THE SOLITARY TRACT MODULATES ARTERIAL PRESSURE VIA HISTAMINE H₁ RECEPTORS

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The tuberomammillary nucleus (TMN) of the posterior hypothalamus has a high density of histaminergic neurons, the projection fibers of which are present in many areas of the brain, including the nucleus tractus solitarius (NTS), which controls arterial pressure (AP).

In this study, we investigated whether the TMN–NTS pathway is involved in central cardiovascular regulation. Bicuculline methiodide, a gamma-aminobutyric acid type A (GABA_A) receptor antagonist, was microinjected into the ventral TMN of anesthetized rats and its effects on AP and heart rate (HR) were observed. We also evaluated the effect of cetirizine, an H₁ receptor antagonist, microinjected into the NTS on cardiovascular responses induced by electrical stimulation of the TMN.

Both AP and HR increased following bicuculline microinjection into the ventral TMN. Similar pressor and tachycardic responses were observed after electrical stimulation of the ventral TMN. Microinjection of cetirizine into the NTS partially inhibited the pressor response but had no effect on HR. Finally, the treadmill test was associated with a high level of c-Fos expression in both ventral TMN and NTS neurons.

These results suggest that the TMN–NTS pathway is involved in regulation of AP, presumably under a high-arousal phase, such as that during exercise.

Key words: tuberomammillary nucleus, nucleus tractus solitarius, arterial pressure, histamine, exercise