

Effect of oral afferent signals in association with salt ingestion on renal function

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Summary

This study was designed to examine gustatory effects on renal function. In particular, functional differences between taste nerves were investigated in the regulation of urine flow and renal sympathetic nerve activity. Urethane- or pentobarbital-anesthetized rabbits and rats were used.

Electrical stimulation (40 Hz, 1 V, 1 ms) of the glossopharyngeal nerve (GPN) for 1 min decreased urine flow. On the contrary, the stimulation of the superior laryngeal nerve (SLN) increased urine flow. The maximal diuretic or antidiuretic effect appeared about 30 min after the stimulation. The effect of electrical stimulation (10-40 Hz, 1 V, 1 ms) of the GPN or the SLN on renal sympathetic nerve activity was examined. The stimulation of the GPN increased the nerve activity, whereas the stimulation of the SLN decreased it. The changes in the nerve activity occurred at the start of stimulation and lasted during application of it. The gustatory effect of salt and water ingestion into the oral cavity on renal nerve activity was also examined. An application of a hypertonic NaCl solution (0.5 M) to the posterior part of the tongue enhanced the nerve activity, whereas an application of water to the larynx reduced it.

These results suggest that oral afferent signals in association with salt or water ingestion modulate renal function. Salt-sensitive fibers contained in the GPN and water-sensitive fibers in the SLN may contribute to the neural regulation of renal function.