REGULATORY MECHANISM OF URINE EXCRETION BY OROPHARYNGEAL/LARYNGEAL MUCOSA IN MAN AND RAT

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SUMMARY

The role of the oropharynx and larynx in body water regulation was studied 1) in human males by measuring urine volume and urine osmolality, and 2) in male rats by recording the electrical activity of the hypothalamic vasopressinergic (VP) cells. In man, hypotonic diuresis was resulted only in the subjects who drink water (0.16 ml/kg body w.) only sufficient to keep their oropharynx moist continually over a 20 min period (slow drinking) but not in those who drank the same volume of water within several seconds (quick drinking). On the other hand, the slow drinking of hypertonic (0.3 M) saline produced hypertonic antidiuresis. Slow drinking of isotonic (0.15 M) saline had no effect on urine excretion. A significant linear relationship was noted between changes in the two urine factors (volume & osmolality) and the concentration of sodium chloride in the ingested water ($P<0.05$). In rat experiment, spontaneous discharge activity of VP cells was inhibited during first few minutes following application of water (0.15 ml/kg) to the oropharynx. In contrast, application of hypertonic (0.3 M) saline made an excitation which lasted for few minutes. An isotonic (0.15 M) saline had no effects in the discharge activity of VP cells examined.

These results suggested that oropharyngeal and/or laryngeal afferents may contribute to the regulation of body water metabolism by changing the releasing activity of hypothalamic VP cells, and that these afferents concerned with body water regulation depend upon the concentration of sodium chrolide in the ingested solution.