

Effects of adrenomedullin (AM) and AM-related peptides on the
hypothalamo-neurohypophysial system: molecular physiological aspects

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Summary

It is well known that the hypothalamus and neuroendocrine system have an important role in regulating sodium intake and sodium balance in a body. Adrenomedullin (AM), a potent hypotensive peptide, has natriuretic effects on the kidney and suppressive effects of salt appetite via central nervous system. Although we demonstrated that AM-like immunoreactivity (LI) co-exists with either arginine vasopressin (AVP)-LI or oxytocin-LI in the paraventricular (PVN) and supraoptic nuclei (SON) of rats, the transportation of AM from the AM-containing cells in the hypothalamus to the posterior pituitary has not been confirmed because there was an apparent lack of AM-LI fibers in the hypothalamo-neurohypophysial tract and posterior pituitary. In the present study, we examined the effects of colchicine-treatment and hypophysectomy on AM-LI in the hypothalamo-neurohypophysial tract of rats. Abundant AM-LI fibers and varicosities were found in the hypothalamo-neurohypophysial tract and internal zone of the median eminence in the colchicine-treated and hypophysectomized rats.

Intracerebroventricular administration of AM (1, 10 μ g) caused a significant increase in the plasma oxytocin level in conscious rats. Central administration of AM caused a marked induction of Fos-LI in the PVN and the dorsal parts of the SON. Central administration of AM, proadrenomedullin N-terminal (PAMP)-12, PAMP-20, calcitonin gene-related peptide (CGRP), amylin and vehicle caused a different induction of Fos-LI in the PVN and SON.

These results suggest that AM and AM-related peptides may have an important role to modulate the neurosecretory cells in the hypothalamus and be involved in the central regulation of sodium balance in a body.