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EFFECTS OF VASOACTIVE INTESTINAL POLYPEPTIDE AND SUBSTANCE P ON CATECHOLAMINE SECRETION FROM CAT ADRENAL GLANDS

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1. The effects of vasoactive intestinal polypeptide (VIP) and substance P (SP) on catecholamine (adrenaline and noradrenaline) secretion were investigated in perfused cat adrenal glands. The distribution of nerve fibers containing these peptides and the outputs of these peptides in response to various stimuli were studied in cat adrenal glands using immunohistochemical techniques and radioimmunoassay.
2. Immunohistochemical studies showed that VIP-, and SP-like immunoreactive nerve fibers were present in adrenal glands. The density and intensity of their fluorescent fibers were weaker in the adrenal medulla than in the adrenal cortex, perivascular site of the cortex and capsula. VIP-, and SP-like immunoreactivities were not observed in cortex and medullary cells.
3. VIP (10^{-6} M) caused an increase in catecholamine secretion from isolated perfused adrenal glands.
4. VIP (10^{-8} M) potentiated catecholamine secretion induced by splanchnic nerve stimulation (10Hz) and pilocarpine (10^{-4} M) from isolated perfused adrenal glands. VIP (10^{-8} M) potentiated nicotine (10^{-5} M)-induced adrenaline secretion.
5. SP (10^{-9} - 10^{-6} M) did not cause catecholamine secretion or affect secretion evoked by splanchnic nerve stimulation, pilocarpine and nicotine in the isolated perfused adrenal glands.
6. In isolated perfused adrenal glands, splanchnic nerve stimulation (10Hz) slightly increased VIP output. Resting VIP levels and VIP output in response to nicotine (10^{-5} M) and pilocarpine (10^{-4} M) were less than the detection limit of the VIP assay (0.8fmole/tube). SP output in response to all secretagogues and the nerve stimulation was less than the detection limit of the SP assay (1.2fmole/tube).
7. In anesthetized cat, splanchnic nerve stimulation (10Hz) slightly increased VIP and SP outputs from the adrenal venous effluent.
8. These results indicate that VIP, but not SP, potentiates catecholamine secretion evoked by secretagogues and splanchnic nerve stimulation, and causes catecholamine secretion at high concentrations. It is suggested that, under physiological conditions, VIP is not the neurotransmitter responsible for catecholamine secretion in cat adrenal glands and that SP did not have any effect on catecholamine secretion in cat adrenal glands.