# PEPTIDE YY INHIBITS FORSKOLIN STIMULATED CHLORIDE SECRETION IN THE SHARK RECTAL GLAND (*SQUALUS ACANTHIAS*): INHIBITION IS REVERSED BY CADMIUM

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Peptide YY was first isolated by Tatmoto in 1980 from porcine small intestine (Nature 1980; 285:471-418). The structure of peptide YY (PYY) is similar to neuropeptide Y (NPY) and human pancreatic polypeptide (HPP). These three peptides are characterized by amino-terminal tyrosine residues and constitute a new family of peptides. Elsewhere in this Bulletin, we report that neuropeptide Y inhibits forskolin and VIP stimulated chloride secretion in the shark rectal gland. In the present experiments, we examined the effect of peptide YY and human pancreatic polypeptide on forskolin stimulated chloride secretion.

Following basal perfusion, the addition of 1 μM forskolin to the perfusate increased chloride secretion from 97±17 μEq/h/g to 425±59, 680±60 and 619±178 at ten, twenty and thirty minutes after addition of forskolin. When peptide YY was present at a concentration of 50 nM in addition to forskolin, chloride secretion rates were 126±36, 108±44 and 95±43 at ten, twenty and thirty minutes following perfusion with forskolin and PYY. Thus, PYY potently inhibited forskolin stimulated chloride secretion ($P<0.005$ at each time point, n=4 perfusions per group, values mean±SEM.) When PYY was removed from the perfusate, chloride secretion promptly increased to 838±142 μEq/h/g. In two experiments, human pancreatic polypeptide at a concentration of 50 nM, did not inhibit forskolin stimulated chloride secretion.

In a second series of experiments, we examined the effect of cadmium chloride on the inhibitory effect of PYY on forskolin stimulated chloride transport. We previously reported that cadmium reverses the inhibitory effect of $A_1$ adenosine receptor agonists in the shark rectal gland. When cadmium chloride (250 μM) was added to the perfusate in the presence of forskolin and PYY, there was an incremental blockade of the effect of PYY to inhibit the response to forskolin. Following thirty minutes of perfusion with PYY in the presence of cadmium, there was no significant impairment of forskolin stimulated chloride secretion.

These experiments demonstrate that PYY, a peptide closely related to neuropeptide Y, markedly inhibits forskolin stimulated chloride secretion in the shark rectal gland. This inhibition is reversed by cadmium chloride.

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