THE INHIBITORY EFFECT OF ATP ON CHLORIDE SECRETION BY THE RECTAL GLAND OF SQUALUS ACANTHIAS IS NOT MEDIATED BY THE ADENOSINE A1 RECEPTOR.

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We have previously shown that ATP and related nucleotides inhibit the secretion of chloride by the isolated perfused rectal gland of the shark (Silva, P., et al., Bull. Mt. Desert Isl. Biol. Lab. 34:49, 1995 and Silva, P., et al., Bull. Mt. Desert Isl. Biol. Lab. 33:75, 1994). The effect of ATP is not mediated by adenosine because it can be elicited by ATP analogs that are not hydrolyzable to adenosine and it is also evoked by the pyrimidine based nucleotide UTP that does not yield adenosine upon hydrolysis. These nucleotides may exert their inhibitory effect through inhibitory adenosine receptors present in the rectal gland. The following experiments were done to ascertain this possibility.

Shark rectal glands were perfused as described in Silva P, et al. Methods Enzymol. Vol 192:754-66, 1990. The glands were stimulated to secrete chloride with forskolin 10^{-6}M. The adenosine analog 8-cyclopentyl methyl xanthine 10^{-5}M (CPT) was used to block the inhibitory A1 adenosine receptor. Two isolated rectal glands were perfused with CPT and adenosine 10^{-6}M to test for the effectiveness of CPT to block the inhibition of chloride secretion normally seen with this concentration of adenosine. CPT blocked the effect of adenosine.

CPT did not block the inhibitory effect of ATP. Figure 1 summarizes the results. In glands stimulated to secrete chloride with forskolin 10^{-6}M, β,γ methylene ATP inhibited the secretion of chloride. In the presence of CPT, β,γ methylene ATP also inhibited the secretion of chloride. Thus, CPT, that blocks the inhibitory effect of adenosine, does not prevent the inhibitory effect of β,γ methylene ATP. We conclude from these results that the effect of ATP to inhibit the secretion of chloride by the rectal gland is not mediated by the inhibitory adenosine receptor.

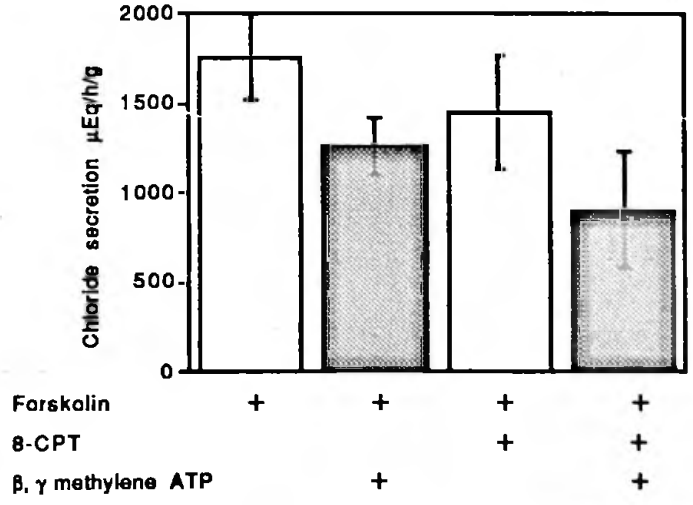

Figure 1. The effect of CPT on the inhibition of the secretion of chloride by isolated perfused rectal glands by β,γ methylene ATP. CPT does not prevent the inhibitory effect of β,γ methylene ATP. Values are mean±SEM, n=5 for glands perfused without 8-CPT and 6 for those perfused with 8-CPT.

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