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EFFECTS OF SECRETIN ON CHOLECYSTOKININ-INDUCED SECRETORY RESPONSES IN ISOLATED PERFUSED PANCREAS AND ISOLATED PANCREATIC ACINI OF RATS

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1. The effects of secretin on pancreatic exocrine secretion induced by physiological doses of CCK-8 (3 and 10 pM) were examined in the isolated perfused pancreas and the isolated perifused pancreatic acini of rats.

2. In the isolated perfused pancreas, the following results were obtained.

Continuous stimulation with CCK-8 (3pM) caused a gradual increase in protein and amylase release to reach a plateau level, which was sustained with stimulation. Continuous stimulation with secretin (40 pM) produced a rapid but small transient increase in protein and amylase release. When CCK-8 (3 pM) and secretin (40 pM) were used simultaneously to stimulate the preparation by pre-treatment with secretin (40 pM) alone, the increase in protein and amylase release was more rapid than that caused by CCK-8 (3 pM) alone. The plateau level of protein and amylase release during the stimulation with both peptide hormones was slightly higher than the level released by the stimulation with CCK-8 (3 pM) alone. The combination of CCK-8 (3 pM) stimulation with secretin (40 pM), however, did not potentiate the CCK-8-induced fluid secretion. A lower concentration of secretin (4 pM) caused neither the acceleration nor potentiation of pancreatic secretory responses.

3. In the isolated perifused acini, the following results were obtained.

Continuous stimulation with CCK-8 (10 pM) induced a rapid increase in amylase release followed by a gradual decline. Continuous stimulation with secretin (40 pM) had no effect on amylase release. Combined stimulation with CCK-8 and secretin induced a secretory response in the later phase slightly larger than that caused by stimulation with CCK-8 alone.

Continuous stimulation with CCK-8 (10 pM) induced oscillatory changes in cytosolic Ca^{2+} concentration, $[Ca^{2+}]_c$, which consisted of an initial rapid rise followed by slight decline, upon which decremental oscillatory spikes were superimposed. Stimulation with secretin (40 pM) had no effect on the $[Ca^{2+}]_c$. Combining CCK-8 stimulation with secretin inhibited the decremental tendency of oscillatory spikes.

4. The present results indicate that CCK-8 induced pancreatic protein release can be potentiated only slightly by simultaneous stimulation with secretin. The weak potentiating effect of secretin may be due to the sustaining oscillatory change in $[Ca^{2+}]_c$.