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ANALYSES OF THE INHIBITORY EFFECTS OF PROCAINE ON PANCREATIC EXOCRINE SECRETION

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Effects of procaine on the secretory responses to carbachol (CCh) and cholecystokinin-octapeptide (CCK–8) were studied in isolated perfused pancreas of rats. After collections of basal perfusate for 30 min, continuous stimulation with CCh (30, 100, 300 or 1000 nM) or CCK–8 (1, 2, 3 or 10 pM) was started in the absence or presence of procaine (0.03 mM) in the perfusion solution. Collections of basal perfusate were made every 10 min for 30 min, and subsequent collections every 5 min thereafter. Then continuous stimulation with CCh at a higher concentration (10 μM) was carried out to induce the second decay phase, procaine (0.1mM) was applied 45 min after the initiation of the stimulation, and stimulation was continued for a further 45 min. Effects of procaine on fluid secretion and protein output were thus examined.

Procaine (0.03 mM) significantly inhibited the secretory responses to continuous stimulation with CCh ranging from 30–300 nM in both fluid secretion and protein output, but did not inhibit the responses to 1,000 nM CCh. The magnitude of the inhibitory effect on fluid secretion was not exactly parallel to that on protein output. Procaine (0.1 mM) caused disinhibition at the second decay phase in secretory responses to CCh at a higher concentration (10 μM). Procaine (0.03 mM) had little, if any, effect on the secretory responses to continuous stimulation with CCK–8 ranging from 1–10pM. The present results showing that procaine inhibited secretory responses to CCh not only in protein output, but also in fluid secretion harmonized with the view that procaine competitively inhibits the CCh binding to muscarinic receptors on the pancreatic acinar cell, which initiates stimulus-secretion coupling.