BIOLOGICAL ACTIVITIES OF PURE NATURAL CHOLECYSTOKININ AND ITS SYNTHETIC PEPTIDE FRAGMENTS: COMPARISON AMONG THE PEPTIDE-INDUCED EXOCRINE SECRETIONS IN ISOLATED PERFUSED RAT PANCREATA

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Secretory activities of natural cholecystokinin (CCK) and its synthetic peptide fragments were compared in isolated perfused rat pancreata. Perfusion of the pancreas with a solution containing various concentrations of CCK or its peptide fragments resulted in a dose-dependent increase in pancreatic protein output and pancreatic fluid secretions.

The estimated ED_{50} (median effective dose) for CCK-10 (C-terminal decapeptide of CCK) and CCK-8 (C-terminal octapeptide) were almost the same as that for CCK. The estimated ED_{max} (maximum effective dose) of CCK-10 and CCK-8 were larger than that of CCK. Examination of the biological potency of CCK-8-OH (an analogue CCK-8 and the amide at the C-terminal was replaced by -OH) revealed that it was only about 1/100 of that of CCK-8. Biological potencies of CCK-5 (C-terminal pentapeptide) and CCK-4 (C-terminal tetrapeptide) were only about 1/5000 of CCK; however, similar dose-response dependencies were obtained for the responses induced by CCK-5 and CCK-4. In spite of these, the C-terminal amino acid sequence was found to be lacking in CCK (1-27), CCK (5-27) and CCK (13-27), which possess low biological activity (less than 1/10,000 of that of CCK). But porcine and human C-peptide showed no common amino acid sequence with CCK and were biologically inactive in these estimations.

The author proposes that the amide at the C-terminal of CCK bears its cardinal share in the biological potency of CCK, and that the amino acid sequence in the intermediate portion of CCK may play a small but significant role in the activity of CCK.