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TRH INJECTED INTRACEREBROVENTRICULARLY INTO THE RAT
STIMULATES EXOCRINE PANCREATIC SECRETION

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The effects of intracerebroventricular (i.c.v.) injection of thyrotropin-releasing hormone (TRH ; pyroGlu-His-Pro-NH₂) and its analogue (DN-1417 ; γ -Butyrolactone- γ -carbonyl-His-Pro- NH₂) on the exocrine pancreas were studied in rats anesthetized with urethane and chloralose.

1) Dose-related increases in flow of pancreatic juice, protein output and amylase output were simultaneously observed following i.c.v. injection of TRH in doses ranging over 0.51-1600 pmol/100g b.w.. Each of these responses reached a maximum within 10 min. Higher doses of TRH induced longer responses.

2) I.C.V. injection of DN-1417 in doses ranging over 1.6-1600 pmol/100g b.w. also caused dose-related secretory responses of the exocrine pancreas. The dose-related secretory responses to TRH and DN-1417 were similar, except that the responses to the highest dose of DN-1417 (1600 pmol/100g b.w.) were significantly higher than the corresponding responses to TRH.

3) Intravenous injection of TRH and DN 1417 induced little, if any, secretory responses of the exocrine pancreas.

4) The secretory responses induced by TRH and DN-1417 were absent after bilateral sectioning of the vagus nerves.

5) Hyperglycemia, tachycardia and tear secretion were also observed following i.c.v. injection but not i. v. injection of TRH or DN-1417. The minimal doses of TRH or DN-1417 needed to induce these effects were larger than those needed to induce secretory responses of the exocrine pancreas.

6) These data suggested that i.c.v. injected TRH or DN-1417 acted within the central nervous system to elicit a vagus-dependent stimulation of exocrine pancreatic secretion and to affect plasma glucose level, heart rate and tear secretion.