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AUTONOMIC NERVOUS CONTROL OF THE GASTRIC MOTILITY
IN THE GUINEA-PIG IN SITU: PARTICIPATION IN
THE NON-ADRENERGIC INHIBITORY NERVES

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Gastric responses to electrical stimulation of the vagus and splanchnic nerves and to esophageal distension were studied in guinea-pigs anesthetized with pentobarbital sodium (40mg/kg i. p.).

1) Stimulation of the central ends of the vagus (VCS) and splanchnic nerves (Spl. CS) and distension of the lower esophagus caused a relaxation of the stomach. Stimulation of the peripheral ends of the vagus (VPS) and splanchnic nerves (Spl. PS) caused principally a contraction and a relaxation of the stomach, respectively. The former was reversed to a relaxation by atropine (0.25-0.5mg/kg i. v.).

2) Relaxations caused by VCS and Spl. CS were completely abolished by hexamethonium (2-20mg/kg i. v.), while those induced by either VPS or Spl. PS and esophageal distension were partially inhibited by the ganglion blockade in the atropinized animals.

3) Pretreatment with reserpine (5mg/kg/day for 2days, s. c.) or guanethidine (60-80mg/kg/day for 2 days, i. p.) caused no significant changes in the responses to VCS, Spl. CS, VPS and to the esophageal distension, but exerted various influences on those to Spl. PS, such as abolishing the response, or conversely, initiating a contraction or a relaxation. All contractile components of these responses were reversed to the relaxation by atropine, but the relaxations were not affected by hexamethonium. A similar result was obtained when phenoxybenzamine (2-20mg/kg i. v.) and carteolol (5mg/kg i. v.) were used.

4) Relaxations caused by VCS and Spl. CS were abolished by bilateral cervical vagotomy, but those elicited by esophageal distension were not. The response to esophageal distension was greatly reduced or abolished by application of procaine (10%) to the cardiac portion of the esophagus or tetrodotoxin (20 μ g) injected into the gastric artery.

5) These results indicate that the non-adrenergic inhibitory pathway in the vagus nerve to the stomach is activated not only by a vago-vagal reflex but also by a splanchno-vagal reflex, that the sympathetic nerve to the stomach also contains postsynaptic, non-adrenergic inhibitory nerves and that a relaxation of the stomach elicited by esophageal distension is mediated by an intrinsic reflex via the non-adrenergic inhibitory nerve in the guinea-pig.