STIMULATION OF OESOPHAGEAL MOTILITY IN THE CAT

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TO MY PARENTS

A C K N O W L E D G E M E N T S

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S U M M A R Y

Literature concerned with reports of stimuli which cause or modify oesophageal activity have been reviewed and has been associated with the evidence obtained in the experiments undertaken.

The preparations of cats which have been used in these experiments were:-

Anaesthetised cats. Chloralose 70 mgm/kgm injected as a solution in saline (70°C), or an organic solvent (dimethyl sulphoxide).

Decerebrated cats.

Decerebrated cats with the spinal cord sectioned at the sixth cervical vertebra.

Decerebrated cats with the spinal cord sectioned at the third cervical vertebra.

Cats with the central nervous system totally destroyed by pithing.

Oesophageal motility has been recorded by isometric and isotonic systems. In all cases oesophageal contractions were detected by balloons 3-5 cc volume.

Contractions of the terminal oesophagus in response to distension of this region have been obtained in the absence of an extrinsic

innervation. These results, and those obtained in decerebrate preparations, indicated the existence of both local and inter-oesophageal reactions. These intrinsic reactions were found to be reflexly modified by stimuli arising in other parts of the preparations, particularly the alimentary tract. The reflexes appeared to be mediated certainly through vagal and possibly through sympathetic afferents to centres in the medulla oblongata or pons. Vagal efferent pathways have been shown to affect the oesophagus, and indications of a sympathetic efferent innervation of the oesophagus have been obtained.

Stimuli which facilitated the local responses of the terminal oesophagus to distension were:-

Greater degrees of distension of this region of the oesophagus. (Very high levels of distension tended to be inhibitory.)

Acidification of the mucosa of the terminal regions of the oesophagus.

Acidification of the isolated stomach to a pH of about 2.0.

Stimuli which inhibited the response of the terminal oesophagus to distension were:-

Distension of a more cranial region of the oesophagus.

High degrees of distension of the oesophagus at the point from which the recording was taken.

Distension of the stomach.

Noxious stimuli arising from the operative procedures.

These facilitatory and inhibitory stimuli were found to summate. The oesophageal response observed was a reflection of the nett afferent discharge.

Reactions of the oesophagus to cholinergic and adrenergic drugs and blocking agents such as atropine, hexamethonium and nicotine have been studied.

The results are discussed in relation to the function of the oesophagus in the intact animal and in relation to how co-ordinated responses are obtained in swallowing and other circumstances.

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