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Observations on the Cause of Gall-Bladder Contraction and Evacuation.

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In a previous communication,[1] we have shown that purified extracts of the duodenal and jejunal mucosa when injected intravenously cause the gall-bladder to contract and to exert pressure on its contents, and at the same time excite the pancreas to secrete. Since that report, Kloster, Lueth and Ivy have made preparations for us, the use of which indicate that "secretin" does not cause the gall-bladder to contract, but that it is some substance closely associated with "secretin," because it is possible to prepare a solution of "secretin" which is free of the gall-bladder excitant.

In more than 10 experiments in which the cystic duct was clamped and the gall-bladder cannulated under barbital anesthesia, we have observed the gall-bladder to contract when 20 or 30 cc. of N/10 HCl were introduced into the duodenum. The latent period of contraction was in most cases less than 2 minutes, whereas the latent period for the pancreatic response varied from 5 to 10 minutes. We have performed up to the present time, 4 cross-circulation experiments. The cross-circulation experiments were performed as follows: 2 "compatible" dogs were given barbital and placed on the table side by side; the pancreatic duct of each animal was cannulated; the cystic duct of each was clamped and the gall-bladder cannulated and attached to a manometer and recording tambour; the most lateral carotid of each animal was prepared for a blood pressure record, and the remaining or medial carotids were connected with cannulae for cross-circulation. In 3 out of 4 experiments the introduction of 40 cc. of N/10 HCl into the duodenum of the "first" dog caused the gall-bladder of the "second" dog to contract. The gall-bladder of the "second" dog, or the one that did not receive acid in the duodenum, contracted after a period of from 8 to 10 minutes. These experiments demonstrate that the introduction of the acid into the duodenum of the "first" animal caused something to enter the blood of the "first" animal, which passed via the cross-circulation to the "second" animal, causing the gall-bladder of the "second" animal to contract. (The pancreas of the "second" dog, or recipient, was only slightly stimulated in one experiment.)

These observations, if they do not prove, certainly show that a

hormone mechanism must be considered, at least, as one of the mechanisms concerned in the normal evacuation of the gall-bladder. We propose the term "cholecystokinin" to designate the active principle which causes the gall-bladder to contract.

[1] Ivy, A. C. and Oldberg, Eric, PROC. SOC. EXP. BIOL. AND MED., 1927, XXV, 113.

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Influence of Narcotics on Ciliary Movement of the Gill of the Oyster.

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Ciliary activity is the simplest as well as the most widespread form of specialized contractile activity. The study of its physicochemical conditions is therefore of fundamental interest in relation to the general problem of the conditions of mechanical action in protoplasm. There have been, however, as yet relatively few quantitative studies in this field. One reason for this is the difficulty of exact measurement. In the ciliated epithelium of metazoa the movement is not integrated (as it is in muscular contraction). Each ciliated cell is automatic and independent in its activity, although the direction of effective stroke is typically constant and there is some transmission between neighboring cells. Nervous control is absent or difficult to demonstrate, although it has been observed in certain invertebrates (*e. g.*, veliger of nudibranchs as shown recently by Carter[1]). Control, reversal, and inhibition are best developed in the ciliate Protozoa; electrical sensitivity is also shown most clearly in this group (electrotaxis of Paramoecium, etc.). The cilia of Protozoa are, however, less favorable for studies of narcosis than cilia of a more automatic type, such as those of the ciliated epithelium of metazoa.

In the present study we have chosen cilia having a high degree of persistence, regularity, and automaticity in their movement, namely the cilia of the gill of the oyster, *Ostrea virginiana*. The gill was removed along the gill axis, and then teased into small pieces of about 3 to 5 mm. in width. There are different kinds of cilia in the gill, but the cilia along the ventral margin of the gill were exclusively used. Movement of these cilia can more easily be observed from the side. Five such pieces of gill were placed in each of a series of glass