When these results are compared with those on man, it is evident that they are less conclusive and reveal marked differences in the reactions of man and dog to the effect of pituitrin and pilocarpine when introduced into the ventricles.

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Effect of Sympathomimetic and Parasympathomimetic Drugs on Motility of the Gastro-Intestinal Tract of Elasmobranch Fishes.

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It has been demonstrated (Nicholls[1]) that excised strips of the stomach of *Raja diaphanes* and *erinacea* suspended in a nutrient solution (NaCl, 16.38 gm.; urea, 21.6 gm.; KCl, 0.894 gm.; $CaCl_2$, 1.110 gm.; $NaHCO_3$, 0.378 gm.; NaH_2PO_4, 0.06 gm.; and dextrose, 1.0 gm. per litre of distilled water; with a pH of 7.8) will react to adrenalin, pilocarpin and acetyl-cholin.

Adrenalin (1:100,000 to 1:250,000) stimulates all parts of the stomach, raising the base-line rate and amplitude of the contractions. The only exception is in the antral region near the pyloric canal, where it stimulates in concentrations of 1:2,000,000, but inhibits in concentrations greater than 1:1,000,000. Adrenalin following pilocarpin or acetyl-cholin has an additive effect. Pilocarpin (1:250,000) and acetyl-cholin (1:100,000) stimulate all parts of the stomach. The former increases the rate and amplitude of the contractions, whereas the latter raises the base-line as well as increasing the rate and amplitude. Atropin (1:250,000) has no effect on the spontaneous contractions, but counteracts the effect of acetyl-cholin and pilocarpin, restoring the contractions to normal.

Thus it was shown that adrenalin not only stimulates isolated strips of the stomach (Dreyer[2] and Lutz[3]), but it has a definite inhibitory action, due probably to the hypersensitivity of a special region of the stomach to adrenalin.

The well marked effect of adrenalin, pilocarpin and acetyl-cholin lends further proof to the fact, first discovered by Bottazzi,[4] that

[1] Nicholls, J. V. V., *Contributions to Canadian Biology and Fisheries*, in press.

[2] Dreyer, N. B., *Trans. Nova Scotia Inst. Sci.*, 1928, **17**, 199.

[3] Lutz, B. R., *Biol. Bull.*, 1931, **61**, 93.

[4] Bottazzi, F., *Z. f. Biol.*, 1902, **43**, 372.

there is a well developed motor sympathetic and parasympathetic nerve supply to the stomach of elasmobranch fishes.

The effect of these drugs on the spiral intestine and valve, colon and rectum was also studied and the results tabulated:

TABLE I.

Region	Adrenalin (1:250,000)	Acetyl-cholin (1:100,000)	Pilocarpin (1:250,000)
I. Spiral Intestine:			
(1) Duodenum	stimulates	stimulates	stimulates
(2) Lower end	"	"	"
II. Spiral Valve:			
(1) Duodenum	"	"	doubtful effect
(2) Lower end	"	"	" "
III. Colon	"	"	stimulates
IV. Rectum	"	"	"

Adrenalin stimulates all these parts, raising the base-line, rate and amplitude of the contractions. However, on two occasions indications of inhibition were found in the spiral intestine, the rate and amplitude of the contractions being lowered. Adrenalin following pilocarpin or acetyl-cholin has an additive effect on all the above parts. These results do not agree with those of Lutz,[3] who found that adrenalin caused a decrease in the tone and inhibition of the motility of the posterior end of the intestine and rectum. Acetyl-cholin stimulates all these parts, raising the base-line, rate and amplitude of the contractions. Pilocarpin acts similarly on all parts except the spiral valve where the effect is doubtful, there being no change in the rate or base-line, though the amplitude of the contractions is usually slightly increased.

Our results confirm those of Bottazzi[4] that stimulation of the vagus activated the gastro-intestinal tract down to the lower end of the spiral intestine, and that stimulation of the 45th to 48th segments of the spinal cord activated the rectum and colon.

Finally, experiments were carried out on the rates of contraction of various parts of the gastro-intestinal tract at different temperatures. At any one temperature different parts of the stomach have different rates of contraction. The parts named in order of decreasing rate are: pylorus, fundic and antral regions of the lesser curvature, fundic region of the greater curvature, antral region of the greater curvature and cardia. The upper and lower ends of the spiral intestine were found to have the same rate of contraction, whereas the upper end of the spiral valve had a more rapid rate than the lower end. In the colon and rectum no rhythmic contractions could be obtained, merely spontaneous spasmodic contractions at

intervals of about one hour. It seems that a gradient of excitability (Alvarez[5]) exists in the spiral valve but not in the spiral intestine, the reason being probably that the spiral valve is mainly responsible for the movement of the contents, while the spiral intestine acts merely as a churning mechanism.

The fact that the colon and rectum only contract spasmodically, are very distensible, and are sensitive to mechanical stimulation such as stretching, would seem to show that their function is that of a reservoir which empties itself from time to time automatically or on distention, their activity being regulated in some way by both divisions of the autonomic nervous system.

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Experimental Endometrial Embolism in the Rabbit.

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The fate of autologous endometrial tissue introduced into the venous circulation was studied in 11 rabbits in the "resting" stage, "in heat," post-partum and also in pregnancy. The operation consisted of laparatomy, with removal of about 1 cm. of a cornu, curettage of this portion, suspension of the scrapings in 3 cc. of homologous blood serum at room temperature, and immediate injection into the rabbit's ear vein. Histologic study of the tissues was made 30 sec., 12 hr., 24 hr., 48 hr., 1 week, 1 month, 69 days, 79 days, 109 days, and 130 days, after operation, the animals except for those which died of "embolic shock" 30 seconds after the injection, remaining in good health the entire period of their survival. The bulk of the cellular material was apparently filtered out in the lung arterioles and capillaries, no adventitious cells being found in the heart, spleen, kidneys or liver. Embolic cells, apparently viable could be recognized one week after injection but none could be identified after that time. Stromal cells possibly survive longer than epithelium. Fibrin is deposited about the cell emboli, their cytoplasm gradually disappears, the nuclei become pyknotic and break up, the embolus becoming converted into a hyaline mass in the smaller vessels and organized in the larger arterioles. Complete absorption or autolysis results in clearing of the pulmonary

[5] Alvarez, W. C., "The Mechanics of the Digestive Tract", 2nd ed., 1928, 55.