

It is not known how much acetylcholine is actually released during the discharge. But the amount which can be split during the time of a discharge may give an indication of the possible amount which can be involved in the process if we assume that acetylcholine is released during that period at a rate similar to that at which it can be split. The duration of one discharge is about 3 millise. The duration of 1600 discharges would be about 5 sec. 400 g of electric organ can split about 500 g acetylcholine chloride in 60 min or about 700 mg in 5 sec which is about 4 millimoles. This would be the maximum amount which can be split, but it is not probable that the whole amount is actually released. The amount of phosphocreatine split during these discharges

corresponds to 3 millimoles. It appears thus possible that the amounts of acetylcholine and phosphocreatine metabolized are of the same order of magnitude and that even a stoichiometric relation exists. The explanation would be that for each molecule of choline acetylated there occurs an endothermic phosphorylation of one molecule, possibly of acetate forming acetylphosphate, the intermediate described by F. Lipmann.⁸ Phosphocreatine would yield this phosphate using ATP as catalyst. The energy required for the resynthesis of the phosphocreatine would be derived from the oxidative breakdown of pyruvic acid, ATP acting again as catalyst.

⁸ Lipmann, F., *Symposium on Respir. Enzymes*, 1942, p. 195.

14042 P

Comparative Effects of Gastroenterostomy and Pedicle Jejunal Graft on the pH of the Gastric Mucosa.*

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Recently, the authors,¹ in a study of the effects of jejunal transplants on gastric acidity, reported a reversal of the normal response to histamine as reflected in direct measurements

of the pH of the mucosal surface of seven different regions of the stomach. The present report deals with the comparative effects of gastro-enterostomy and a jejunal transplant

TABLE I.

pH of Gastric Mucosa Before and After Gastroenterostomy and Following Conversion of the Jejunum About the Anastomosis to a Pedicle Graft.

Each figure represents the Average of 7 different regions of the stomach.

Dog	Before gastroenterostomy			After gastroenterostomy			After conversion to pedicle graft		
	Fasting	10 min after	20 min after	Fasting	10 min after	20 min after	Fasting	10 min after	20 min after
1849	6.4	4.7	2.0	6.9	6.1	5.9	7.1	7.4	7.6
1854	4.7	4.0	2.3	5.9	4.0	2.9	5.6	7.0	7.1
1909	6.3	2.0	0.9	5.2	5.3	3.5	3.6	5.3	5.4
1917	5.5	4.7	2.1	4.1	5.4	4.9	6.2	6.7	7.0
1934	4.6	4.1	2.4	5.9	2.6	1.9	3.5	4.4	5.3
1967	3.0	2.6	1.7	6.2	4.5	1.8	2.5	3.5	3.9
Average	5.1	4.0	1.9	5.7	4.6	3.5	4.8	5.9	6.1

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¹ Stefko, Paul, Andrus, Wm. DeW., and Lord, J. W., Jr., *Science*, 1942, **96**, 208.

upon this same factor.

Methods. A series of 6 dogs was operated upon and after determining the pH of the gastric mucosa by inserting the electrodes of the Beckman pH meter through an opening at the site of the future anastomosis, an anterior gastro-enterostomy was performed. From one to 4 weeks later further pH determinations were made through a gastrotomy proximal to the gastro-enterostomy stoma. Immediately thereafter the portion of the jejunum involved in the anastomosis was converted into a pedicle graft by dividing and

inverting the bowel about 3 cm proximal and distal to the stoma and then restoring the continuity of the intestinal tract by end-to-end suture. Again, pH determinations were made at varying intervals after operation.

Results. In 5 out of 6 animals gastro-enterostomy alone failed to prevent a marked diminution of the average pH of the mucosa of 7 different regions of the stomach following the injection of histamine. (Table I.) After conversion of the gastro-enterostomy to a jejunal graft, however, the normal response to histamine was reversed in all 6.

14043 P

Comparative Effects of Pedicle Grafts from Different Levels of Intestinal Tract on pH of Gastric Mucosa.*

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The finding that pedicle grafts of jejunum implanted in the wall of the stomach have a profound effect on gastric secretion¹⁻³ leads obviously to an investigation of the effects of similar grafts from other portions of the intestinal tract. We wish to report herewith the results of such grafts on the pH of the gastric mucosa.

Methods. Medium sized mongrel dogs of both sexes were used in these experiments and the following routine employed. A laparotomy was performed and the pH of the gastric mucosa of 7 different regions of the stomach measured by inserting the electrodes of the Beckman pH meter through a gastrotomy.

Immediately thereafter a portion of the anterior gastric wall approximately 4 cm x 6 cm was excised and the defect closed by inserting a pedicle graft of intestine. The continuity of the bowel was restored by end-to-end anastomosis. In 4 animals the graft was taken from the duodenum, in 5 from the jejunum, in 3 from the ileum and in 3 from the transverse colon. The graft in each instance consisted of a segment of bowel about 6 cm in length, opened along the antemesenteric border, and with its blood supply intact.

Following this operation the pH of the mucosa was again measured through a gastrotomy at varying intervals.

Results. Transplants from the ileum and colon are without effect so far as influencing the pH of the gastric mucosa after histamine is concerned. On the other hand, with both the duodenal and jejunal grafts the pH of the mucosa rose after the administration of histamine. In the present series the jejunal grafts were somewhat more effective than the duodenal.

* This study was carried out under a grant from the John and Mary R. Markle Foundation.

¹ Stefko, Paul, Andrus, Wm. DeW., and Lord, J. W., Jr., *Science*, 1942, **96**, 208.

² Lord, J. W., Jr., Andrus, Wm. DeW., and Stefko, Paul, *Arch. Surg.*, in press.

³ Andrus, Wm. DeW., Lord, J. W., Jr., and Stefko, Paul, *Proc. Soc. Exp. Biol. and Med.*, 1943, **52**, 99.