

Clinical Studies on a New Pepsin Inhibitor.*

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Dogs in which gastric ulcers were produced by daily histamine injections were kept alive longer than usual when the peptic activity of the gastric juice was inhibited by sodium lauryl sulfate which did not alter the pH.¹ In *in vitro* experiments sodium lauryl sulfate completely inhibited peptic activity without alteration of the pH.² We have therefore studied the effect of sodium lauryl sulfate on the peptic activity of gastric juice of patients suffering from peptic (gastric, duodenal or stomal) ulceration.

Procedure. Peptic ulcer patients, proven by x-ray, were used for this study. A Rehfuß tube was introduced into the stomach of the fasting patient and the gastric contents aspirated. With the tube *in situ*, the patient

received 2 crackers and one glass (200 cc) of water. Samples of gastric juice were aspirated every 15 minutes for 2 hours. Determinations of the pH (by the Beckman Electrometer) and peptic activity (by a modification³ of the Anson-Mirsky Hemoglobin Method)^{4,5} were made on each specimen. On succeeding days the same procedure was repeated but immediately after the test meal the patient received either (a) 100 or (b) 200 mg of sodium lauryl sulfate, or (c) 2 g of calcium carbonate, or (d) 8 cc of an aluminum hydroxide preparation. Some patients were given 100 or 200 mg of sodium lauryl sulfate immediately following the fourth aspiration. Each patient was tested for 5 successive days.

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¹ Shoch, David, and Fogelson, S. J., *Quart. Bull. Northwestern Univ. Med. School*, 1942, **16**, 2.

² Shoch, David, and Fogelson, S. J., *PROC. SOC. EXP. BIOL. AND MED.*, 1942, **50**, 304.

³ Beazell, J. M., Schmidt, C. R., Ivy, A. C., and Monaghan, J. G., *Am. J. Dig. Dis.*, 1938, **5**, 661.

⁴ Anson, M. L., and Mirsky, A. E., *J. Gen. Physiol.*, 1932, **16**, 59.

⁵ Anson, M. L., and Mirsky, A. E., *J. Gen. Physiol.*, 1938, **22**, 79.

TABLE I.

Average of the pH and Peptic Activity as Obtained in 24 Peptic Ulcer Patients Following (a) Ewald Meal and (b) Ewald Meal Plus Calcium Carbonate, Aluminum Hydroxide, or Sodium Lauryl Sulfate (aspirations at 15-minute intervals). Representative values of samples taken at 15 minutes, 1 hour and 2 hours shown.

	Fasting stomach		Aspirations		
			15 min	1 hr	2 hr
pH	2.8	Ewald test meal	2.6	1.5	1.7
Peptic activity*	1,620		1,150	1,570	1,760
pH	2.9	Ewald plus calcium carbonate (2 g)	5.4	2.2	1.7
Peptic activ.	1,450		710	1,450	1,720
pH	3.2	Ewald plus aluminum hydroxide (8 cc)	5.1	2.5	1.8
Peptic activ.	1,400		650	1,230	1,710
pH	2.6	Ewald plus sodium lauryl sulfate (100 mg)	2.7	2.0	1.7
Peptic activ.	1,310		1,040	1,520	2,090
pH	2.8	Ewald plus sodium lauryl sulfate (200 mg)	3.1	1.7	1.8
Peptic activ.	1,310		970	1,570	1,750

*Peptic activity measured in milliunits.

TABLE II.
Average of the pH and Peptic Activity as Obtained in 12 Peptic Ulcer Patients Following Ewald Test Meal and After Ewald Test Meal Plus Sodium Lauryl Sulfate at Hourly Intervals (aspirations at half-hour intervals).

	Fasting stomach		1 hr		2 hr
pH	3.7	Ewald test meal	1.7		1.7
Peptic activity	1,250		1,010		1,460
pH	3.6	Ewald plus sodium	1.7	Sodium lauryl sulfate	1.3
Peptic activ.	1,210	lauryl sulfate (100 mg)	1,200	(100 mg)	1,520
pH	3.9	Ewald plus sodium	2.0	"	1.8
Peptic activ.	1,070	lauryl sulfate (100 mg) (duplicate test)	1,200		1,430
pH	3.7	Ewald plus sodium	3.0	Sodium lauryl sulfate	1.8
Peptic activ.	1,040	lauryl sulfate (200 mg)	1,190	(200 mg)	1,580
pH	3.6	Ewald plus sodium	1.9	"	1.9
Peptic activ.	1,480	lauryl sulfate (200 mg) (duplicate test)	1,270		2,050

* Peptic activity measured in milliunits.

Results. The results agreed fairly closely between determinations on these patients on various test substances; regardless of the initial pH and peptic activity, the response to the test substance was similar. Thus nearly all patients responded markedly to calcium carbonate and to the aluminum hydroxide preparation and comparatively little to sodium lauryl sulfate. Slight variation in response to sodium lauryl sulfate was noted when it was given on successive days. The entire results are shown in Tables I and II, each of which represents the average of the pH and peptic activity of the cases studied.

Discussion. Following the simple test meal there was a rather slow drop of the pH in all cases. The peptic activity decreased slightly at first but then rose so that after 2 hours it was higher than at the beginning of the test period. Calcium carbonate and the aluminum hydroxide preparation caused the greatest rise of pH and the greatest decrease in peptic activity for the longest time (45 to 60 minutes) but after 2 hours the values for either were similar to those obtained with the test meal (Table I). Neither pH nor peptic activity were significantly affected by the administration of 100 mg

sodium lauryl sulfate (the average peptic activity, rather, being highest during this test day). After 200 mg of sodium lauryl sulfate a slight rise in pH and a decrease in peptic activity were noted.

The administration of a second dose, 100 or 200 mg, of sodium lauryl sulfate after 1 hour did not influence pH or peptic activity (Table II). In all cases, peptic activity was associated with alteration (drop) of pH. Failure of sodium lauryl sulfate to cause inhibition of peptic activity in peptic ulcer patients, on the usual medical regimen was also noted by Kirsner and Wolf.⁶ The latter, however, noted inhibition of peptic activity if the diet was free of phospholipids.

Summary. Calcium carbonate and an aluminum hydroxide preparation caused inhibition of peptic activity and a rise in pH of the gastric juice of peptic ulcer patients. One hundred mg of sodium lauryl sulfate caused no significant changes, whereas 200 mg caused a slight rise in pH and decrease in peptic activity. In the presence of unchanged pH no pepsin inactivation by sodium lauryl sulfate occurred.

⁶ Kirsner, Joseph B., and Wolf, Regis, personnel communication.