11086

Effects of Atropine and Fat on Gastric Secretion Stimulated by Alcohol.

JOHN S. GRAY AND WILLIAM H. BACHRACH. (Introduced by A. C. Ivy.)

From the Department of Physiology and Pharmacology, Northwestern University Medical School, Chicago.

Although dilute alcohol has become a popular gastric test meal, little is known about its mode of action or the possible influence of other drugs upon its action. Local contact with the gastric mucosa appears not to be essential for its action since alcohol has been reported to be an effective stimulus for the secretion of acid gastric juice when introduced into the rectum (Babkin[1]) or into the small intestine,[2, 3] or even intravenously.[4, 5] Neither section of the vagi[6] nor the sympathetics[7] interferes with its action on the gastric glands. Orbeli[6] has stated that atropine in very large doses (5 mg) abolished the effect of alcohol in one dog. Kreuger and MacIntosh[8] have more recently stated that large doses (0.3 mg per kg) of atropine completely inhibited the secretion of gastric juice in response to alcohol; smaller dose, however, served merely to diminish the response. These results suggest that alcohol resembles histamine, which has been shown to be much more resistant to the inhibitory effect of atropine than is the usual meal stimulus.[9] In order to investigate this possibility further, the effect of atropine on the gastric secretory response to alcohol and to a meal has been determined in Pavlov pouch dogs.

Methods. Three dogs with the Pavlov type of gastric pouch were used. In one series of experiments 100 g of beef hearts ground and brought to a boil in 100 cc of water were fed to the dogs either alone, or with 50 cc of olive oil, or with 1 mg of atropine sulfate adminis-

1 Babkin, B. P., *Die Aussere Sekretion der Verdauungsdrusen*, Julius Springer, Berlin, 1928.

2 Chittenden, R. H., Mendel, L. B., and Jackson, H. C., *Am. J. Physiol.*, 1898, **1**, 164.

3 Ivy, A. C., and McIlvain, G. B., *Am. J. Physiol.*, 1923, **67**, 124.

4 Petrovitch, A., and Bokanowa, E., *C. R. Soc. Biol.*, 1929, **102**, 633.

5 Newman, H. W., and Mehrtens, H. G., PROC. SOC. EXP. BIOL. AND MED., 1932, **30**, 145.

6 Orbeli, L. A., *Arch. des. Sci. biol.*, 1906, **12**, 71.

7 Ishido, B., *Biochem. Z.*, 1922, **130**, 151.

8 Kreuger, L., and MacIntosh, F. C., *Am. J. Dig. Dis.*, 1937, **4**, 104.

9 Gray, J. S., *Am. J. Physiol.*, 1937, **120**, 657.

TABLE I.
Effects of Atropine and Olive Oil on Gastric Secretion.

	Dog No. 1					Dog No. 2					Dog No. 3				
	No. of Tests	Vol. cc	Free acid mg	Total acid mg	% Inhib. of free acid	No. of Tests	Vol. cc	Free acid mg	Total acid mg	% Inhib. of free acid	No. of Tests	Vol. cc	Free acid mg	Total acid mg	% Inhib. of free acid
100 g beef heart	10	41.1	109.6	144.2		11	26.7	57.8	75.1						
" " " " —1 mg atropine	2	12.0	0	8.2	100	3	6.4	0	0.8	100					
" " " " —50 cc olive oil	6	19.1	4.4	39.1	96	4	7.2	1.2	4.9	98					
120 cc of 7% alcohol	6	15.0	18.5	31.5		7	14.8	22.8	31.5		8	14.5	14.7	27.8	
" " " " " —1 mg atropine	6	8.2	5.5	10.6	66	5	8.5	5.8	12.6	75	4	10.4	10.4	18.3	29
" " " " " —50 cc olive oil	6	11.8	18.2	25.8	18	6	13.8	15.3	25.4	19					

tered subcutaneously. In a second series of experiments the meat meal was replaced by 120 cc of 7% alcohol administered by stomach tube. In all cases the gastric juice was collected over a 3-hour period and titrated for free acid (Topfer's reagent) and total acid (phenolphthalein).

Results. The results, in the form of averages for the different experiments are presented in Table I. It can be seen that 1 mg of atropine sulfate completely abolished the gastric secretory response to the meat meal, but only partially reduced the response to 7% alcohol. Similarly, the alcohol stimulus proved to be more resistant than the meat meal to the inhibitory action of olive oil.

The available evidence suggests that a close resemblance exists between the actions of alcohol and histamine on the gastric glands. The action of both is resistant to the inhibitory action of atropine and fat, and Kreuger and MacIntosh[8] have reported that both stimulate the production of a juice of high acidity and low pepsin concentration.

Conclusions. In dogs with Pavlov pouches the gastric secretory response to dilute alcohol is resistant to the inhibitory effects of atropine or fat.

11087

Photoelectric Study of Liebermann-Burchard Reaction and Its Significance in Determination of Cholesterol.

WILLIAM S. HOFFMAN.

From the Department of Physiological Chemistry, The Chicago Medical School, Chicago.

The common colorimetric method for the determination of cholesterol is based upon the Liebermann-Burchard[1] reaction, in which acetic anhydride and concentrated H_2SO_4 are added to a dilute solution of cholesterol in chloroform. The color produced is at first blue, then becomes green and finally, on long standing, a yellow-brown. This reaction, in spite of its apparent simplicity, has proved difficult to control, for the intensity as well as the shade of the color is markedly influenced by small differences in the concentrations of the reagents, the presence of traces of water or other impurities, time, and temperature. The many previous efforts to control these factors

1 Liebermann, C., *Ber. Deut. Chem. Ges.*, 1885, **18**, 1803.