there were distinctly more parietal cells. No difference could be attributed to the sex of the animals, and the size of the injected quantities of histamine was not clearly related to the degree of response. However, the animals which were subjected to the longer series of injections showed somewhat greater increases in parietal cells than did those which were injected for only 2 weeks. Five additional similarly treated animals died with perforated pyloric or duodenal ulcers before completion of the injections. No animals with ulcers were used for estimation of parietal cell increases.

Estimation of the number of other cell types in the mucosa is more difficult than reckoning the parietal cells, which are usually clearly outlined and easily identified. Therefore, counts of other cell types have not been made.

Nothing was seen to suggest that the increase in number of parietal cells was due to any process other than true hyperplasia. No partially granulated parietal cells were recognized. It is probable that the increase in cells represents a response to stimulation of function.

Summary and Conclusion. An increase in number of parietal cells occurs in the mucosa of the guinea pig stomach after protracted stimulation with histamine over a period of 2 to 4 weeks. This is presumably a hyperplasia and may indicate a mechanism to explain differences in the number of secreting cells in different human stomachs.

15111

Effect of Digitalis on Cholinesterase.

OVIDIO MIQUEL AND WALTER F. RIKER, JR. (Introduced by McKeen Cattell.)

From the Department of Pharmacology, Cornell University Medical College.

The mechanism through which digitalis brings about a slowing in cardiac rate has been the subject of a number of views. Abdon *et al.*[1] have suggested that the digitalis bradycardia might be explained as the result of a sensitization of the myocardium to acetylcholine, possibly through the inhibition of cholinesterase. These workers repeated certain experiments of Matthes[2] using a colorimetric method for the determination of acetylcholine, and were in agreement with him in finding no inhibition of the enzymatic breakdown of acetylcholine by *g*-strophanthin in concentrations up to 1:5000.

No data other than these summary statements of a negative result are given in these reports, and other references to the effect of digitalis on cholinesterase have not been found. Further evidence on this point has been obtained with a specific cholinesterase prepared from the electric organ of the eel as well as with non-specific human serum esterase.

The following digitalis glycosides were studied: digitoxin, ouabain, strophanthin, and lanatoside C. The effect of each of these substances was tested on both serum esterase and eel cholinesterase, using a concentration range approximating that which might obtain in the blood following a therapeutic dose, as well as higher concentrations. For the determination of cholinesterase activity the Warburg manometric technic was employed. Dilution of the glycosides was made in saline, and 0.5 cc of this was added to 3 cc of a 0.02 M solution of acetylcholine in the vessel. The acetylcholine solution was made by dissolving 225.9 mg of acetylcholine bromide in 50 cc of 0.03 M sodium bicarbonate. In the case of controls, saline alone in an equivalent amount was added to the flask. The enzyme dilution (0.5 cc) was placed in the side bulb and later tipped into the reaction mixture. The final dilution of human serum after tipping was 1:40, and of the eel esterase 1:3200.

1 Abdon, N. O., and Nielsen, N. A., *Skand. Arch. Physiol.*, 1938, **78**, 13.

2 Matthes, K., *J. Physiol.*, 1930, **70**, 338.

TABLE I.

Glycoside	Dilution, × 1000	Esterase	mm³ CO_2/30 min Control	with glycoside	% change
Digitoxin	1:5,000	Eel	130.69 (3)*	132.14 (3)*	+ 1.1
"	1:1,000	"	134.60 (3)	152.64 (3)	+13.4
"	1:1,000	Serum	165.59 (3)	178.64 (3)	+ 7.9
"	1:100	Eel	109.92 (3)	124.20 (3)	+13.0
"	1:10	Serum	196.55 (3)	191.08 (3)	— 2.8
Ouabain	1:250	Eel	73.00 (1)	83.40 (1)	+14.2
"	1:250	Serum	142.80 (1)	150.48 (1)	+ 5.4
"	1:100	Eel	91.44 (3)	88.85 (3)	— 2.8
"	1:10	"	73.17 (3)	81.64 (3)	+11.6
"	1:10	Serum	188.64 (3)	173.79 (3)	— 7.9
Strophanthin	1:500	Eel	98.59 (2)	85.54 (3)	—13.2
"	1:500	Serum	181.06 (3)	189.04 (3)	+ 4.4
"	1:10	"	186.72 (3)	208.99 (3)	+11.9
Lanatoside C.	1:40	Eel	73.70 (2)	81.10 (3)	+10.0
" "	1:40	Serum	220.74 (3)	221.87 (3)	+ 0.5

* The numbers in parentheses indicate the number of determinations and the value shown is the average.

The flasks were equilibrated with a mixture of 5% carbon dioxide and 95% nitrogen, and allowed to reach thermal equilibrium in the bath at 37°C. After an initial reading the vessels were tipped and readings made at 10-minute intervals for a period of one to 2 hours. Controls were run simultaneously in each experiment.

Using the straight line portion of the hydrolysis curve over a period of one-half hour, the results were expressed as the number of mm³ of carbon dioxide liberated per 30 minutes.

Table I shows the results of 15 experiments on the effect of the different dilutions of the various glycosides on both serum and eel esterase. In general there is no significant alteration in the activity of either enzyme as a result of the addition of digitalis. An average increase for all the glycosides and all dilutions of 3.1% for eel esterase and 2% for the serum esterase took place but in view of the individual variations these differences cannot be regarded as significant.

The serum esterase activity of 2 cats was determined at a time when the animals were near death as a result of intravenous doses of digitoxin, given at 5-minute intervals. One cat received 0.444 mg/kg over a period of 97 minutes, and the other 0.675 mg/kg of digitoxin in 135 minutes. The esterase activity of the serums taken just prior to death in each case was not significantly different from the values obtained before digitalis.

Summary. These results confirm the observation that the cardiac slowing by digitalis is not due to inhibition of cholinesterase.

15112

Exaggerated Discharge of Neurosomes into Spastic Muscle by Heat Reflex.*

EBEN J. CAREY, LEO C. MASSOPUST, EUGENE HAUSHALTER, AND WALTER ZEIT.
From the Department of Anatomy, Marquette University School of Medicine, Milwaukee, Wisc.

Morphologic evidence of the transmission of nervous substance into the myoplasm of spastic muscle from the motor end plates has not been demonstrated. Neurosomes were first described as "auriphilic inclusion masses"

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