decrease in heart muscle potassium and increase in heart muscle sodium after DOCA and after a low potassium diet. The change was more marked when both factors were combined. Grollman and Grollman(10) analyzed the heart muscle of nephrectomized dogs maintained by peritoneal dialysis and noted minimal changes in the same direction. These contradictory electrolyte shifts may have been the result of more effective dialysis than we were able to achieve in our rats; however, it is apparent from our data that potassium depletion and sodium excess were not needed to produce myocardial necroses.

Summary. Thirty-six rats were divided into 3 equal groups; control, nephrectomized and nephrectomized-dialyzed. A specific cardiac lesion was found in 8 nephrectomized animals with 2 other animals showing minimal lesions. The nephrectomized-dialyzed animals demonstrated 3 definite lesions and 6 minimal lesions, whereas control animals showed one minimal lesion. The nephrectomized-dialyzed animals had a normal serum sodium, whereas the nephrectomized animals showed a significant decrease. Both groups of animals showed a moderately elevated serum potassium and had identical increases in cardiac content of potassium and decreases in sodium per unit of dry weight. The dissociation of frequency of cardiac lesions in the 2 groups of nephrectomized animals, despite identical sodium and potassium content, suggests that electrolyte concentration is not the significant factor causing the myocardial lesion.

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Received July 17, 1961. P.S.E.B.M., 1962, v109.

Effect of Tetraethylammonium Chloride on Cardiac Muscle Fiber Responses.* (27249)

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It is well known that various compounds produce an increase in amplitude and duration of the action potentials of tissues such as crustacean muscles(1) and dorsal root ganglion cells(2). Tetraethylammonium (TEA) ion has a more powerful action than many of these compounds and is thought to affect the membrane by modifying Ca^{++} permeability(3). It is of interest to determine how tissues other than those mentioned above are affected by TEA and how the action proposed might change functions of cardiac muscle in particular.

Methods. Trabecular muscles and Purkinje fibers were obtained from the ventricles of dogs anesthetized with nembutal (40 mg/kg). The tissues were perfused with oxygenated Tyrode solution at 37°C(4). Stimulation and recording from single cells was effected by means of a micropipette (5 Meg. Ω) penetrating the cell membrane(5). TEA was administered by perfusing the tissue with a modified Tyrode solution in which 50% of

* Supported by grant from Life Insurance Medical Research Fund.

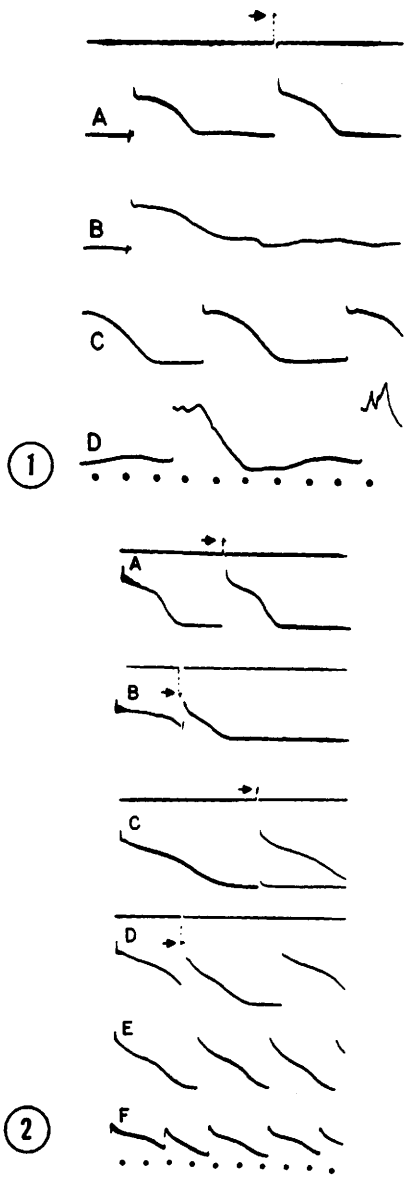

FIG. 1. Effects of TEA on trabecular muscle fibers. A. Normal transmembrane potentials produced by external stimulation (left) and intracellular stimulation (right). B. Prolongation of action potential produced by external stimuli shortly after (3 min.) TEA administration. C. Beginning of spontaneous firing (3-5 min. after TEA administration). D. Changes occurring 5 min. later. Time interval 200 msec.

FIG. 2. Effects of TEA on Purkinje tissue. A. Spontaneous and induced contraction before and (C) shortly (3 min.) after TEA administration. Changes in extra responses produced early in the cycle (B) are shown in D. E and F show accelerated rate of firing, reduction in amplitude and the premature origin of action potentials which eventually occurs.

the NaCl had been replaced by TEA; TEA concentration was 56mM/l.

Results. Changes were noted in tissue responses within 2 minutes after perfusion with TEA was begun. Fig. 1 shows normal responses to externally and internally applied stimuli (A) and the developing effects of TEA on trabecular muscle fibers. Following an initial prolongation of the response (action potential) to an applied stimulus (B) spontaneous firing began (C). This was soon followed by a heightening of the action potential accompanied by production of a multiplicity of spikes during the plateau phase (D). There likewise appeared to be an oscillation or a wave-like fluctuation in the resting and action potentials. The contractile responses became unusually strong and somewhat atypical. The resting potentials were not markedly affected by TEA in the concentration administered.

Tetraethylammonium chloride was found to produce an initial prolongation of spontaneously occurring action potentials of Purkinje fibers (Fig. 2-A and C). There was an associated slowing of rate of beat. Extrasystoles induced by applying stimuli during the recovery phase of a preceding response were likewise prolonged in duration (B and D). Eventually there was a marked acceleration of rate; action potentials were less regular, and some originated before complete repolarization had occurred (E and F). These results indicate creation of a degree of instability in the membrane as well as an effect on duration and amplitude of electrical and mechanical responses.

Discussion. Ion fluxes and relative concentrations are known to affect action potential durations and the stability of membranes (6). Calcium ion is known to have a stabilizing action. Numerous compounds affect the characteristically long action potentials of ventricular tissues. Some metabolic inhibitors shorten the action potential and cause development of spontaneous activity while other compounds have an opposite effect(7). It is felt that they directly or indirectly modify ion transport and balances. TEA, though initially prolonging action potentials, eventually creates an instability. The best

evidence available indicates this is due to an effect on Ca^{++} permeability(3).

Summary. Tetraethylammonium chloride was found to increase greatly the amplitude and duration of cardiac trabecular and Purkinje fibers. It also produced an acceleration of firing in spontaneously active Purkinje tissue and the appearance of spontaneous activity in trabecular muscle.

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Received July 28, 1961. P.S.E.B.M., 1962, v109.

Effect of Triton WR-1339 on Lipoproteins and Lipoprotein Lipase of Guinea Pig Plasma. (27250)

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The hyperlipemia induced by Triton WR-1339, a non-ionic surface-active detergent, may be attributed to an alteration of plasma lipoproteins which results in a decrease in normal lipid catabolism(1). Although the precise nature of the alteration is unknown, the view suggested by Schotz and his coworkers(2) that some change in plasma lipoproteins occurs which interferes with lipid-clearing enzyme has received considerable attention. They found that plasma collected shortly after injection of Triton in rats inhibited the activity of lipoprotein lipase on a coconut oil emulsion. The inhibitory effect of Triton was shown to be a result of alteration of the substrate. Recently, Hirsch and his associates(3) reported that lipemic plasma from Triton-treated rabbits was not cleared by lipoprotein lipase. The purpose of the present study was to investigate the effect of Triton on plasma lipoproteins and lipoprotein lipase in the guinea pig.

Material and methods. Normal, male, albino guinea pigs (400-500 g) were maintained on a stock diet of commercial pellets supplemented with fresh cabbage. Guinea pig plasma used as a source of lipoprotein lipase was obtained from normal animals 30 minutes after intracardiac injection of heparin (7.5 U.S.P. units/kg). The animals were bled by cardiac puncture under sodium pentobarbital anesthesia using 3.8% sodium citrate as an anticoagulant(3). Blood samples were centrifuged at 600 $\times$ *g* and 5°C for 20 minutes; the plasma was removed, recentrifuged, and stored at 5°C. Lipemic plasma used as substrate was obtained from guinea pigs which were maintained on a diet prepared by mixing 8 g of corn oil with 92 g of commercial pellets. With the exception of heparin treatment, plasma was obtained and separated as described above. The Triton-treated animals were injected subcutaneously with a sterile 12.5% solution of Triton WR-1339 (lot #N328PA, Winthrop Labs., New York) in 0.16 M sodium chloride in a dosage of 300 mg/kg. Control animals received an equal volume of sterile saline.

Clearing of lipemic plasma by lipoprotein lipase was measured turbidometrically. Duplicate determinations were performed; each sample contained 2 ml of lipemic plasma, 2 ml of phosphate-buffered saline (pH 7.2), and 1 ml of post-heparin plasma. Substrate controls which contained 2 ml of lipemic plasma and 3 ml of buffered saline also were prepared. The optical density at 500 mμ was read initially and after 30 minutes' incubation at 37°C. The instrument was standardized with a blank tube which contained 5 ml of buffered saline. Lipolytic activity, expressed as % clearing, was calculated by di-