results) may account for the absence of light areas in adult female prostates.

Conclusions. In some young normal female rats, as in young castrated males, the prostate grows, develops large acini, high epithelium and light areas diagnostic of a secretory state. In both, the prostate differentiation is maintained only until about 40 days when regression begins. The factor causing this temporary differentiation is thought to be the juvenile cortex of the adrenal.

10753 P

Delayed Prothrombin Clotting Time in Avitaminosis A and Pellagra-Like Chicks.

HERMAN C. MASON AND MARGARET E. SMITH. (Introduced by Lloyd Arnold.)

From the Department of Bacteriology and Public Health, University of Illinois College of Medicine, Chicago, Ill.

A study is being made of the virus-neutralizing properties of fowl blood, plasma and serum, and the relation of refractoriness to prothrombin clotting time in avitaminosis.

Dam, Schønheyder, Tage-Hansen,[1] Almquist,[2] and Quick[3] have shown that prothrombin deficiency can be detected in chicks on a depleted vitamin K diet at an early date.

The experiments herein reported were designed to test prothrombin clotting time on chicks depleted of vitamin K,[2] vitamin A,[4] and of chicks kept on the pellagra-like "F" ration of Ringrose, Norris and Heuser.[5] The chicks used in these experiments came from the same parent stock and received rations prepared bi-weekly. Several control series of chicks in the past showed that depletion of vitamin A occurred between the 7th and 14th days with an average weight of 31-32 g at death. The chicks on the pellagra-like "F" ration were in good health and weighed 61.2 g. To produce depletion 60 day-old chicks were placed on each vitamin deficiency level making a total of 180 chicks. Only the K free chicks were kept from their

[1] Dam, H., Schønheyder, F., Tage-Hansen, E., *Biochem. J.*, 1936, **30**, 1075.

[2] Almquist, H. J., *J. Biol. Chem.*, 1936, **114**, 241.

[3] Quick, A. J., *Am. J. Physiol.*, 1937, **118**, 260.

[4] Emmett, A., and Peacock, G., *J. Biol. Chem.*, 1923, **56**, 679.

[5] Ringrose, A., Norris, L., and Heuser, *Poultry Sci.*, 1930-31, **10**, 166.

feces. The normal controls were kept on a chick start ration plus milk ad lib.

For the estimation of prothrombin in chick plasma Quick's[6] wet and dry methods were employed. 1.5 cc of blood drawn from the heart was used in each determination. The clotting time was read by means of an interval timer and the beginning of the clot taken as prothrombin time. The dry method exhibits more variation in its activity than the wet confirming Quick. The values obtained by Quick and by us allow no quantitative estimation or at best were roughly so for vitamin K free chicks. Our shortest clotting time on normal controls was 5-13 sec. in contrast to 10-11 sec. obtained by Quick.

The results indicate clearly with both wet and dry methods that the normal clotting time may vary, with the average time ranging from 12 to 40 sec. Thirty determinations on 15 ten-day-old chicks depleted of vitamin K gave prothrombin clotting times over 50 sec. and longer. Twenty-six determinations on 13 ten-day chicks, and 25 determinations on 7 thirteen-day chicks maintained on the vitamin A deficiency ration gave prothrombin clotting values over 5 minutes and longer. Twenty-eight determinations on 14 eleven-day chicks kept on the pellagra-like "F" ration gave prothrombin clotting values over 5 minutes with but one chick exhibiting a clotting time of 25 sec. with both methods. Occasionally normal control chicks sustained on standard commercial rations may give prothrombin clotting values over several minutes.

At present no curve for prothrombin values based on Quick's results and ours can be considered reliable in the chick, or as he states comparable to the rabbit. Further we can find no relation between blood clotting time and prothrombin clotting time. If one attempts to plot the relation of the clotting time of recalcified chick plasma to the concentration of prothrombin in plasma, the results yield exceedingly slight values to infinity for the prothrombin concentration. Quick's statement that prolongation of the clotting time to 45-50 sec. corresponds to a prothrombin concentration of less than 10% of normal with a distinct hemorrhagic tendency in vitamin K depleted chicks raises several questions in the depleted vitamin A and pellagra-like "F" ration chicks, because of the occurrence of prothrombin clotting times over 50 sec. and longer without the hemorrhagic tendency manifesting itself. The studies of Ringrose,[5] Emmett[4] and Cruikshank[7] do not record the presence of a hemorrhagic

[6] Quick, A. J., *Am. J. Physiol.*, 1935-36, **114**, 285; *J. A. M. A.*, 1938, **110**, 1658.
[7] Cruikshank, E. M., *Nut. Abs. Rev.*, 1935-36, **5**, 2.

tendency associated with the other severe changes in any of the chicks maintained on their numerous deficient rations. Furthermore, the delay in prothrombin clotting time reported by us is not associated with a spontaneous hemorrhagic tendency to date. The blood clotting time was within normal limits for the vitamin A deficient and pellagra-like chicks. What relation these deficiencies have with the statement of Almquist and Stokstad[8] that spontaneous recovery occurs in vitamin K depleted birds as they grow older is not yet clear.

At the present time the presence of anemia is being investigated. Also other vitamin deficiencies are being studied and their rôle on the prothrombin clotting time. Vitamin K assays on the avitaminosis A and pellagra-like chicks are being carried on.

Summary. Chicks receiving avitaminosis A and pellagra-like "F" rations failed to show normal prothrombin coagulation time. The plasma prothrombin clotting time was greatly delayed in these avitaminotic chicks without the distinct hemorrhagic tendency of a vitamin K depletion manifesting itself.

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Effect of Chemical Irritation of a Venous Segment on Peripheral Pulse Volume.

MICHAEL DEBAKEY, GEORGE E. BURCH AND ALTON OCHSNER.

From the Departments of Surgery and Medicine, School of Medicine, Tulane University, New Orleans, La.

In view of clinical observations suggesting the possibility of ipsolateral arterial and arteriolar vasoconstriction in femoro-iliac thrombophlebitis,[1] the present investigations were undertaken to study some of the factors which may be concerned with such a phenomenon.

The influence of local chemical femoral thrombophlebitis upon the volume of pulsations was studied in the hind feet of 12 dogs. The volume of pulsations was determined plethysmographically and recorded continuously by Turner's[2] method, sensitive to volume

8 Almquist, H., and Stokstad, E., *J. Nut.*, 1937, **14**, 239.

1 Ochsner, Alton, and DeBakey, Michael, *Surgery*, 1939, **5**, 491; also *J. A. M. A.*, in press.

2 Turner, R. H., *J. Clin. Invest.*, 1937, **16**, 777.