has been added. The acid or alkali was added to prevent flocculation. The alcohol albumin was prepared by adding 40 cc. alcohol to 50 cc. 1 per cent egg albumin to which 10 cc. of 0.3 N Na_2CO_3 have been added. This solution was allowed to stand over night before using.

In testing the antigenic character we used precipitin and anaphylactic reactions. Both reactions show that the denatured albumin, whatever be the agent of denaturation, is immunologically different from the natural albumin. The albumins denatured by different agents are closely related, though not identical.

This is a preliminary report.

[1] Wu, H., and Yen, D., *J. Biochem.* (Japan), 1924, iv, 345.
[2] Wu, H., and Wu, D. Y., *J. Biol. Chem.*, 1925, lxiv, 369.
[3] Wu, H., *Chinese J. Physiol.*, 1927, i, in press.

3421

The Period of Induction in Blood Clotting.

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What are the changes taking place in blood plasma from the time it is drawn until the first fibrin appears? Although this period of apparent inactivity occupies the major portion of the so called "clotting time," it has received very little attention from students of the problem of blood clotting. Our recent work establishes certain facts concerning this latent period, or period of induction.

First, fibrin production is not a continuous process, beginning when blood is drawn, but occurs with sudden onset and rapid completion in only a final small part of the "clotting time." If one oxalates plasma only a few seconds before the first signs of fibrin appear, the clotting is completely inhibited. Under such conditions we find the blood fibrinogen unchanged, so that the final appearance of fibrin as a clot represents its actual time of production. Second, since thrombin acts well in the presence of oxalate, we must conclude that, up to the time of oxalation a few seconds before clotting occurs, there has also been no thrombin formed.

Third, preformed thrombin takes over twice as long to clot citrated plasma as it does to clot this same plasma immediately after recalcification, although calcium has no influence on the action of such preformed thrombin. From this we must conclude that the

more rapid clotting in the recalcified plasma is due to the formation of new thrombin to aid the old in the fibrin production. We have shown that such formation of new thrombin in plasma may take place in 10 to 20 seconds, when some agent, such as preformed thrombin or tissue fibrinogen, is acting to start a removal of the blood fibrinogen from the plasma. Evidently, once prothrombin is free in the plasma, its activation to thrombin is only a matter of seconds. Therefore in the normal clotting of plasma there can be no free prothrombin up to within a short time preceding the appearance of fibrin.

The latent period preceding fibrin formation seems, then, to be concerned with changes that lead to a liberation of the prothrombin in the plasma. Our work has shown that a variety of agents tending to hasten dissociation, such as the electric current, X-rays, rise in temperature, dilution with water or saline, and the presence of tissue fibrinogen, will all act to shorten this latent period, although not affecting the rate of fibrin production in most instances. The conclusion seems justified that such dissociation is the essential factor in the liberation of prothrombin, and that the speed of this change determines the length of the latent period and thus of the clotting time. Once such dissociation is accomplished, the real clotting reactions take place with great rapidity.

This is a preliminary report.

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The Action of Pseudoephedrine Upon the Kidney.

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It has been shown[1] that pseudoephedrine has a blood pressor effect about half as great as ephedrine, and that its effect on the peripheral vessels is opposite to that of ephedrine. Pseudoephedrine dilates the peripheral vessels.[2] Hence it was thought possible that pseudoephedrine might act as a diuretic.

A series of experiments upon 25 dogs was undertaken to see if the dilation of the peripheral vessels applied to the gross effect of pseudoephedrine upon the kidney in the intact animal; moreover whether there was an increase in the secretion of urine, and its relationship to blood pressor effects. The effects of repeated injections were also studied.