second stage of the latent period, in such wise that the reaction with antigen produces a cellular stimulus, with muscular contraction in case of the uterus. It is for this reason, that the combination of antigen and antibody in the blood never produces an anaphylactic response.

The "activation" by the cells also greatly increases the avidity of cellular antibody for antigen, as has been shown in previous papers. Exactly the same features differentiate cellular from circulating antibodies after active sensitization.

23 (955)

A test for antithrombin in the blood.

By ALFRED F. HESS, M.D.

[*From the Research Laboratory, Board of Health, New York City.*]

The method of testing for antithrombin in the blood is at present very difficult, as it requires the preparation of a pure fibrinogen containing no prothrombin, that is to say, which does not clot upon the addition of calcium, and also the preparation of a pure thrombin which can be made from fibrin. As a result the method is hardly adaptable to general clinical use.

For some time I have employed a method which seems to meet this difficulty. For this purpose about 9 c.c. of blood are aspirated and put into 1 c.c. of 1 per cent. sodium oxalate. The blood is centrifugalized and the plasma siphoned off in the usual way. The plasma is then recalcified by adding 2, 3, 4 and 5 drops respectively of a ½ per cent. calcium chloride solution. In this way we ascertain the general coagulability of the plasma which is the composite of a number of factors,—prothrombin, fibrinogen and antithrombin, and we determine the optimal amount of calcium for this particular plasma. If we heat some of this plasma to 60° C., the prothrombin, as is well known, is destroyed and the fibrinogen is coagulated. After filtering off this coagulum, we have a plasma which contains antithrombin. The strength of this antithrombin may be ascertained for clinical purposes as follows:

First from a normal case we prepare human plasma just as we prepared the oxalated plasma which is to be tested. Five drops of this plasma are put into five thoroughly cleansed vials. One of these serves as a control, to the second three drops of the normal antithrombin is added, to the third five drops of normal antithrombin; to the fourth three drops of the antithrombin that is to be tested, and to the fifth five drops of this antithrombin. All tubes are equalized in amount by the addition of normal salt solution and the mixtures are allowed to remain in contact for fifteen minutes. The plasma is then recalcified by the addition of ½ per cent. calcium chloride, the number of drops which are to be added being determined by the previous coagulability test which should always precede the antithrombin test. As a rule,

TABLE I.

ANTITHROMBIN TEST.

Normal			Hemophilia		
Control	3 Anti.	5 Anti.	3 Anti.	5 Anti.	
—	—	—	—	—	2 min.
+	+	+	+	+	4 "
+++	+++	++	+++	++	6 "
		+++		+++	8 "

four drops is the optimal amount. However, it may be that we have to add a different amount for the normal plasma than for the plasma that is being tested. The time of coagulation is then noted in the usual way. Table I illustrates a test of this nature. It reproduces a test in a case of hemophilia and shows that there was no increase of antithrombin as compared to the normal. There is considered to be an excess of antithrombin if the tubes to which three and five drops of antithrombin have been added, are greatly delayed in coagulating, as compared to the normal. The validity of this test has been determined by means of preparing a solution of hirudin of a strength of 1–40,000 or 1–50,000, which about equals the strength of the antithrombin in human plasma, and testing this upon the normal plasma in the same way as we determine human antithrombin. It will be noticed that the prothrombin and antithrombin are not delicately balanced in the blood and that even when we double the amount of antithrombin, the coagulation is hardly delayed.

Table II shows what may be called the *Coagulation Equilibrium* test. This is performed by adding the antithrombin of the test case to its own plasma instead of to the plasma of a normal case. This tells us how delicately the coagulation is balanced. For example in Table II, which is the plasma of the same hemophilia case as in Table I, we see that the coagulation time is markedly delayed by the addition of its own antithrombin. This is not due to an excess of antithrombin, as we have seen from Table I, but simply means that the plasma is in a very stable condition and that a slight excess of antithrombin will prevent its coagulation. If this coagulation equilibrium-test turns out negatively and there is little delay, it serves at the same time as a test for antithrombin and we may deduce that this substance is not increased.

TABLE II.

EQUILIBRIUM TEST.

Control	3 Anti.	5 Anti.	
—	—	—	6 min.
+	+	+	10 "
+++	+	+	12 "
	+++	+	15 "
		++	35 "
		+++	43 "

24 (956)

Studies on the relationship between creatine and creatinine.

By **V. C. MYERS** and **M. S. FINE.**

[*From the Laboratory of Pathological Chemistry, New York Post-Graduate Medical School and Hospital.*]

When muscle tissue is allowed to autolyze, creatine is transformed to creatinine at a constant rate. The velocity of this reaction increases with a rise in temperature, although practically negligible at 0° C. The rate of formation at body temperature is nearly sufficient to account for the daily elimination of creatinine. The velocity of the reaction is increased by acids but not reduced by Henderson's neutral phosphate mixture. Added creatine experiences the same fate as the creatine originally present, while