cemic when given 100 gm. of glucose, it is clear that they were unable to lay down glucose as glycogen at the normal rate. This delay accounts for the excess of glucose in the blood and the consequent glycosuria. Surgical removal of 50% of the dog's liver causes a similar delay in clearing the blood of extra glucose.[2]

Therefore, it appears to be true that hyperglycemia and diabetic glucose tolerance curves simulating milder forms of true diabetes mellitus may be produced by disturbances within the liver which are associated with obesity. Since the term diabetes mellitus implies a diminished capacity for oxidizing glucose, such patients as those described above do not belong under this heading even though they conform to the diagnostic criteria for diabetes as ordinarily interpreted. Their abnormal utilization of carbohydrate was corrected by simple reduction of weight to normal.

9184

Chemospecific Flocculation of Sterols by Anti-Sterol-Sera.

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Some years ago, one of us reported experiments concerning the antigenic qualities of cholesterol and derivatives of cholesterol, using the method of complement-fixation.[1, 2] Flocculation tests, which were not published, confirmed the results with complement-fixation. In the meantime, Hahn and Hazado[3] reported experiments on a flocculation of cholesterol by cholesterol antisera. Since the demonstration of a specific and sensitive flocculation of cholesterol by the serum of animals injected with cholesterol (and a protein *"schlepper"*) furnishes a new and valuable argument for the haptenic quality of sterols, our own data are now given.

The great sensitivity of sterol sols toward salts may be obviated by adding 2 volumes of water to the serum-dilutions. The specific

2 Coller, F. A., and Troost, F. L., *Ann. Surg.*, 1929, **90**, 781-793.

* c/o Lederle Laboratories, Inc., Pearl River, N. Y.

1 Weil, A. J., and Besser, F., *Klin. Wschr.*, 1931, page 1941.

2 Weil, A. J., and Besser, F., *Z. Immunforschg.*, 1932, **76**, 76.

3 Hahn, F., and Hazado, W., *ibid.*, 1936, **88**, 16.

TABLE I.

Showing Specific Flocculation of a Sol of Cholesterol by Anticholesterol Immune Serum.

0.5 cc. H_2O and 0.25 cc. 1/6% sol of cholesterol are added to decreasing amounts of inactivated serum, diluted with saline to a volume of 0.25 cc.

Amount of serum, cc.	a Anticholesterol immune serum	b Serum of a normal rabbit
0.05	+++	—
0.03	+++	—
0.02	+++	—
0.01	++	—
0.006	+	—
0.004	+	—

Readings after 24 hrs. at room temperature.

Controls, containing either serum or cholesterol sol alone, showed no flocculation.

flocculation of sterol sols (prepared according to Keeser[4]) is very slow under such conditions, but is maximal in 24 hours at room temperature.

Table I gives an example of such an experiment.

We were able to produce flocculations with cholesterol, di-hydrocholesterol and oxy-cholesterol (Lifschütz) and the corresponding antisera. Data on the preparations used and the method of immunization are given in the papers of Weil and Besser. The qualitative and quantitative relations of specificity were the same as reported for the complement-fixation test, that is, there is some cross-reaction between cholesterol, di-hydrocholesterol, and oxycholesterol (Lifschütz), but the specific antigen showed always a much stronger flocculation and a higher titer than the others. None of our sera reacted with cholesterol dibromide, cholesterol acetate, cholesterol palmitate, or cholesterol oxide (Westfalen), nor was there any reaction of these sera with alcoholic extracts of beef heart. Sera of normal rabbits, including those of our rabbits before immunization, gave no reaction with any of these substances.

In some preliminary tests on the quantitative conditions of the cholesterol-anticholesterol flocculation we used twentyfold and fortyfold amounts of the mixtures of immune serum, distilled water, and cholesterol given in the table in order to determine the cholesterol content of the entire mixture, of the floccules, and of the supernatant in a total volume of 20 or 40 cc. These data, together with the content of cholesterol of the sols and the immune serum used, were in good agreement, so that our method may be used for the further quantitative study of antigen-antibody reactions of this kind.

On the basis of these experiments it may be stated that the amount

[4] Keeser, *Biochem. Wschr.*, 1924, **154**, 321.

of cholesterol flocculated by our method is proportional to the amount of antibody used. For instance, 10 cc. of a serum diluted 1 :10 flocculated 11.4 mg. out of a sol containing 158 mg. % cholesterol, whereas the dilution 1 :20 flocculated 5.5 mg., and the dilution 1 :40, 2.6 mg. under the same conditions.

9185

Tests for the Blood-C. N. S. Barrier in Experimental Poliomyelitis.*

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It is well known that the mechanism regulating exchange between the blood and the central nervous system and spinal fluid is disturbed in all types of meningitis, allowing both normal blood constituents and foreign substances to pass into the spinal fluid (reviewed by Katzenellenbogen[1]). While a "meningeal stage" has been described in poliomyelitis, the origin of the cells in the subarachnoid spaces appears to be from the perivascular spaces of the medullary substance. This communication will give the results of several tests of the blood central nervous system barrier in experimental poliomyelitis. Such findings have a bearing on specific treatment, since a gross barrier defect would allow free passage of neutralizing substances from blood into the medullary substance and spinal fluid.

Flexner and Amoss[2] while showing that the virus did not regularly pass from the blood to the nervous system, suggested that a defect in the barrier might be of importance in the natural pathogenesis of this disease in man. The failure to find virus-neutralizing substances in the spinal fluid of man during convalescence,[3] although these substances are present in the blood of a large number of human convalescents even during and prior to paralysis,[4] could be explained

* Supported by a grant from the President's Birthday Ball Commission for Infantile Paralysis Research.

1 Katzenellenbogen, S., *The Cerebrospinal Fluid and Its Relation to the Blood,* Baltimore, The Johns Hopkins Press, 1935.

2 Flexner, S., and Amoss, H. L., *J. Exp. Med.*, 1917, **25**, 525.

3 Flexner, S., and Amoss, H. L., *J. Exp. Med.*, 1917, **25**, 499.

4 Harmon, P. H., Harkins, H. N., Fahey, J. J., and Wasbotten, P. M., PROC. SOC. EXP. BIOL. AND MED., 1936, **34**, 585.