teriophage in the body these results raise several questions of somewhat wider interest. Does the mechanism of removal of phage units from the blood stream by the spleen and liver or by the circulating phagocytes as reported by Eliava[6] involve the mechanism of phagocytosis as has been observed for microscopic particles? A direct answer to this question is desirable but how to obtain such evidence does not appear obvious. The second question is concerned with the possible existence of an analogy between the fate of phage in the blood stream and that of filterable viruses which may get into the blood of the host. An answer to this query would be of value in a better understanding of those diseases caused by the filterable viruses.

Summary. It has been demonstrated that bacteriophage injected intravenously into rats accumulates in the spleen and liver. These organs accumulate phage to the same general degree as they do bacteria.

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Effect of Acidosis upon Production of Agglutinins and on Blood Proteins in Rabbits.

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A few reports in the literature indicate that acidosis hinders the production of agglutinins. Various substances have been used to produce an acidosis. Ammonium chloride produces a prolonged acidosis in man.[1, 2] Davesne and Haber[3] thought they obtained a decrease in agglutinin production while administering hydrochloric acid. Moen and Reimann[4] obtained a poor response or no agglutinin production to typhoid vaccine in uncontrolled diabetic patients with acidosis.

In the experiments reported here, rabbits were given three 0.5 cc. intravenous injections of suspensions of killed typhoid bacilli on alternate days. In 12 normal rabbits the agglutinin titer averaged

6 Eliava, G., *Comp. rend. Soc. de Biol.*, 1930, **105**, 829.

1 Burdon, J. B., and Haldane, S. H., *J. Physiol.*, 1921, **55**, 265.

2 Lui, S. H., and Hastings, A. B., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 781.

3 Davesne, J., et Haber, P., *Annales de l'Institute Pasteur*, 1932, **49**, 220.

4 Moen, J. K., and Reimann, H. A., *Arch. Int. Med.*, 1933, **51**, 789.

1:320 at the end of the first week, with variations from 1:60 to 1:5120 dilutions, 1:1450 at the end of the second week, 1:800 third and 1:750 at the end of the fourth week.

Another series of 12 rabbits were given, in addition, 0.3 to 1.3 cc. of a 10% solution of ammonium chloride intravenously daily. The average agglutinin titer at the end of the first week was 1:50 with variations of from 0 to 1:320, second week 1:20, third week 1:10 and at the end of the fourth week 1:10 dilution. Three rabbits died during the first and second week. The animal with a titer of 1:320 at the end of the first week, later dropping to 1:10, had a plasma CO_2 combining power of 46 volumes %, which progressively decreased later to 23.0 volumes %. In 3 rabbits with no agglutinin production throughout the plasma CO_2 was consistently below 33 volumes %.

The average CO_2 values in the animals receiving ammonium chloride was 27 volumes % with variations from 46 to 18.3 volumes %. The average plasma CO_2 combining power in normal rabbits was 50 volumes %.

The plasma proteins in the first series increased, especially the globulin fraction which had increased 22% over the initial value. In 6 rabbits receiving ammonium chloride changes in blood protein were much less marked. At the end of the third week the globulin fraction was slightly increased, however, the red cell counts also increased and the animals lost weight during the course of the experiments, partly due at least to dehydration. Repeated bleedings are said to cause an increase in blood proteins.[5] Three rabbits bled 6, 7 and 17 times, from 1.5 to 2.5 cc. at each bleeding, showed an increase in globulins of 15, 17 and 40% in a period of 3 weeks. Three animals given suspensions of graphite intravenously also had increased globulins of 8, 35 and 45%.

The above results indicate that acidosis diminishes the production of agglutinins to a marked extent. Stimulation of the reticuloendothelial system by various means, such as by the injections of foreign proteins, repeated hemorrhages or particulate matter apparently produces an increase in plasma proteins, particularly the globulin fraction. Parallel blood volume changes should be made, however, to draw definite conclusions on this phase.

[5] Schmidt, R. A., and Tuljschinskaja, K., *Z. f. Immunit. u. Exp. Ther.*, 1931, **70**, 8.