

The phytopharmacological findings were as follows. In each experiment 10 seedlings were examined for their normal growth in normal Shive solution, 10 seedlings in a 1 per cent solution of normal human blood serum, and 10 seedlings in a 1 per cent solution of hemophilic blood serum. It was found that the coefficients of growth in normal blood serum were 73, 71 and 73 per cent, which are the figures always obtained by Macht and his collaborators in other studies on blood. The coefficients of growth obtained with hemophilic serums were 74, 70 and 72 per cent respectively. In other words, the blood serum of the hemophilic subjects behaved absolutely like normal human blood serum. These findings speak against the presence of a substance which is toxic for plant protoplasm. The authors are not aware of any toxicity or hemophilic blood for animal tissues. The results, therefore, agree completely with the view of Howell and Cekada,³ namely, that the delayed clotting of hemophilic blood is probably not due to any toxic chemical substance present in it but rather to other causes such as the greater resistance of the blood-platelets.

¹ Macht, D. I., and Lubin, *PROC. SOC. EXP. BIOL. AND MED.*, 1923, **xx**, 208.

² Macht, D. I., *PROC. SOC. EXP. BIOL. AND MED.*, 1925, **xxiii**, 209-210.

³ Howell, W. H., and Cekada, *Am. J. Physiol.*, 1926, **lxxviii**, 500.

⁴ Macht, D. I., and Livingston, M. B., *J. Gen. Physiol.*, 1922, **iv**, 573.

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Non-Sensitizing Protein Antigens.

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For certain organ transplantations it has been necessary for us to find two distinct protein antigens toward which dogs may be rendered equally and practically invariably hypersensitive. We have found a very wide variation in canine susceptibility to different proteins, wholly unexpected from our experience with other animal species. The following are typical results:

(a) *Horse Serum*: Dogs injected subcutaneously with 0.5 cc. horse serum per kilogram of body weight, followed 24 hours later by an intravenous injection with the same dose, are almost invariably hypersensitive if tested after an incubation period of about 21

days. Fully 95 per cent of them are thrown into severe anaphylactic shock on intravenous injection with 1 cc. horse serum per kilogram of body weight, with fatalities in about 20 per cent of the cases. With 2 cc. horse serum per kilogram of body weight the fatalities are increased to about 40 per cent.

(b) *Goat Serum*: Dogs injected with the same doses of goat serum and tested after the same incubation period are usually not demonstrably hypersensitive. Only about 30 per cent of them give recognizable anaphylactic reactions on intravenous injection with 2 cc. goat serum per kilogram of body weight.

(c) *Egg White*: Dogs injected with the same doses of 50 per cent egg white (Ringer's solution) and tested after the same incubation period, give no suggestion of anaphylaxis, even on intravenous injection with doses as large as 5 cc. 50 per cent egg white per kilogram of body weight.

There is evidently a determining factor in canine protein sensitization of which we are at present wholly ignorant.

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Erythrocyte Anaphylaxis in Dogs.

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Dogs injected intraperitoneally with 0.5 cc. 50 per cent horse erythrocyte suspension per kilogram of body weight followed 24 hours later by an intravenous injection with the same dose, are almost invariably hypersensitive if tested after an incubation period of about 20 days. The shock thus produced, however, differs materially from the shock in canine serum anaphylaxis.

In serum anaphylaxis, the characteristic precipitous fall in arterial blood pressure and the characteristic contraction of the urinary bladder do not begin till at least 45 to 60 seconds after commencing the intravenous protein injection. This is the time necessary for the formation or liberation of histamine-like depressor substances by the hypersensitive liver and their transmission to other parts of the body. In erythrocyte anaphylaxis (Fig. 1) both reactions begin within 15 to 20 seconds after commencing the intravenous corpuscle injection, the same time relations as those observed on intravenous injection with histamine.