

A Phytophysiological Examination of Hemophilic Blood.

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The senior author has already called attention to the usefulness of plant test-objects in studying certain blood conditions. Thus Macht and Lubin have by means of the seedlings of *Lupinus albus* been able to make an extensive study of menstrual blood and demonstrate its toxicity for plant protoplasm.¹ Macht has reported the marked effect of the serum from patients suffering with pernicious anemia when such serum was examined for its toxicity on seedlings, so that the method could and was actually used for differential diagnosis between primary leukemia on the one hand, and secondary anemia and leukemia on the other.² In the present communication the authors wish to report the phytopharmacological findings obtained in three cases of hemophilia. In the case of one of these (Y) they studied the serum of a patient whose blood had already been very carefully examined by Howell and Cekada.³ These authors found that the prothrombin, fibrinogen, calcium and the anti-coagulants which exist in the circulating blood were quite normal. They came to the conclusion that the right explanation for the delayed clotting in hemophilia is to be found in the resistant properties of the blood-platelets.

In the present investigation the tests were made on the growth or elongation of the roots of young seedlings of *Lupinus albus* by methods described elsewhere.⁴ Several experiments were made with the blood of each patient, and the results of all of them were very clear-cut as compared with normal blood serum.

Patient Y, 26 years old, was one of three brothers, all suffering from hemophilia, who have been carefully studied by Prof. Howell over a period of many years. The blood picture in this case was quite normal and there were no other complications. The clotting time in this case was $2\frac{1}{2}$ hours.

Patient B, is a man thirty-five years old, also showing a normal blood count, but a delayed coagulation time of about 30 minutes.

Patient K is a boy eight years old who also exhibited a normal blood picture with the exception of delayed clotting time. The coagulation time in this case was about $1\frac{1}{2}$ hours. This patient exhibited some purpuric spots about his extremities.

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