

as the test organism for the assay of pantothenic acid, has been applied to evaluating the level of this vitamin in blood and urine.

It was found that the pantothenate content of blood from 17 normal persons ranged between 0.030 and 0.099 μg per ml of blood and averaged 0.059 μg per ml. The pantothenate content of 24-hour urine specimens from 9 persons ranged from 1.46 mg to 6.79 mg and averaged 3.81 mg.

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Experimental Alimentary Azotemia: Comparative Effects of Red Cells and Plasma.

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In a previous paper,¹ the authors showed in experimental animals that the ingestion of whole blood produces a marked rise in the urea nitrogen content of the recipient's blood. This observation agreed with that of Schiff, *et al.*,² Kaump and Parsons,³ and Yuile and Hawkins⁴ and indicated that the azotemia occurring in clinical cases of bleeding peptic ulcer might also be caused by blood absorption.

In an attempt to find what element in the blood caused the rise, 5 dogs were given beef plasma by stomach tube in the first series of experiments and in the second series of experiments 5 dogs were given beef cells in the same manner. In all 10 experiments blood samples were taken every day at 2 a.m., 8 a.m., 12 noon, 4 p.m., and 8 p.m., one day before giving the substance to be tested and for at least 2 days thereafter. In all instances the dogs given cells showed a much more marked elevation in blood urea nitrogen than did the plasma fed dogs. A typical curve is shown in Chart 1.

Effect of hemoglobin. Administration of a pure hemoglobin solution to 2 dogs produced a rise in blood urea nitrogen comparable to that produced by cells alone.

Effect of iron. To rule out the action of the iron in the hemo-

¹ Chunn, C. F., and Harkins, H. N., *PROC. SOC. EXP. BIOL. AND MED.*, 1940, **45**, 569.

² Schiff, L., Stevens, R. J., Goodman, S., Garber, E., and Lublin, A., *Am. J. Dig. Dis.*, 1939, **6**, 597.

³ Kaump, D. H., and Parsons, J. C., *Am. J. Dig. Dis.*, 1940, **7**, 191.

⁴ Yuile, C. L., and Hawkins, W. B., *Am. J. Med. Sci.*, 1941, **201**, 162.

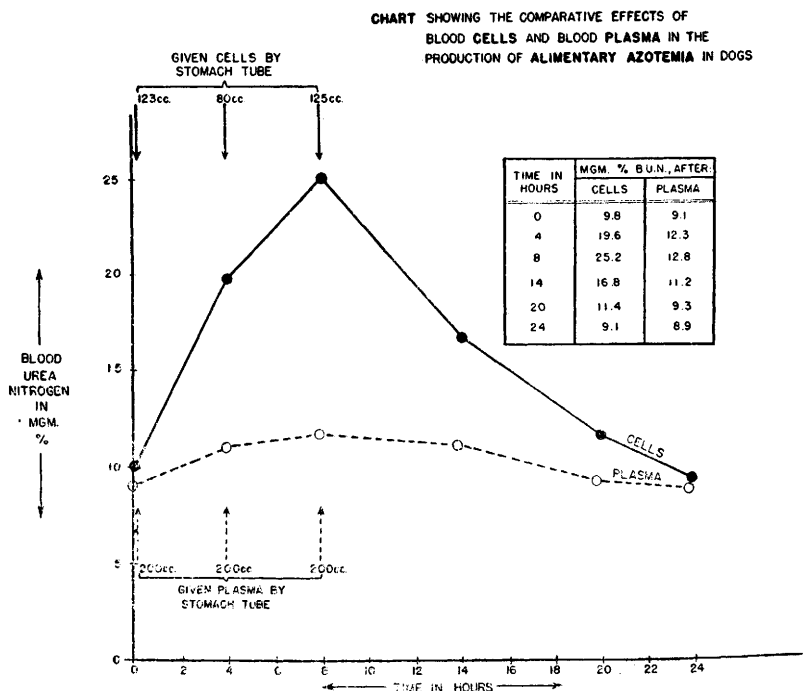


FIG. 1.

globin, 2 dogs were given 1 g of iron each by stomach tube in the form of 10% iron ammonium citrate (one gram of iron is the amount normally present in 1000 cc of blood). No azotemia resulted.

Effect of protein. Two dogs were given a single large protein meal consisting of casein and ground beef, the first dog receiving 83 g of protein and the second 175 g. A marked rise in blood urea nitrogen occurred.

Effect of urea. Experiments were done to confirm the common observation that urea alone will produce a blood elevation when given by mouth. However, the urea content of the beef cells used in our experiments listed above was not appreciably greater than the urea content of beef plasma. Therefore, the urea inherent in the cells could not have been the important factor in causing the alimentary azotemia.

Conclusions. Alimentary azotemia results from blood absorption from the intestinal tract. The important blood elements in this regard are the red cells and particularly their contained hemoglobin. The protein fraction rather than the iron content is the active portion of the hemoglobin.