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Gravity Shock in Rabbits. I. Lack of Correlation Between Plasma Protein and Specific Gravity.

WILLIAM H. COLE, JAMES B. ALLISON, AND ALAN A. BOYDEN.

From the Bureau of Biological Research, Rutgers University, New Brunswick, N.J.

The calculation of protein concentration from the specific gravity of human and dog serum or plasma^{1,2} has been widely used in clinical and experimental laboratories especially since the development of the falling drop method for measuring specific gravity,^{3,4} because it is quicker than analyses by the

Kjeldahl method. It is important to know how the serum or plasma protein concentration changes in traumatic, hemorrhagic, and other kinds of shock, as well as in other pathological conditions, and much reliance has been placed on specific gravity determinations on the blood of such subjects.⁵

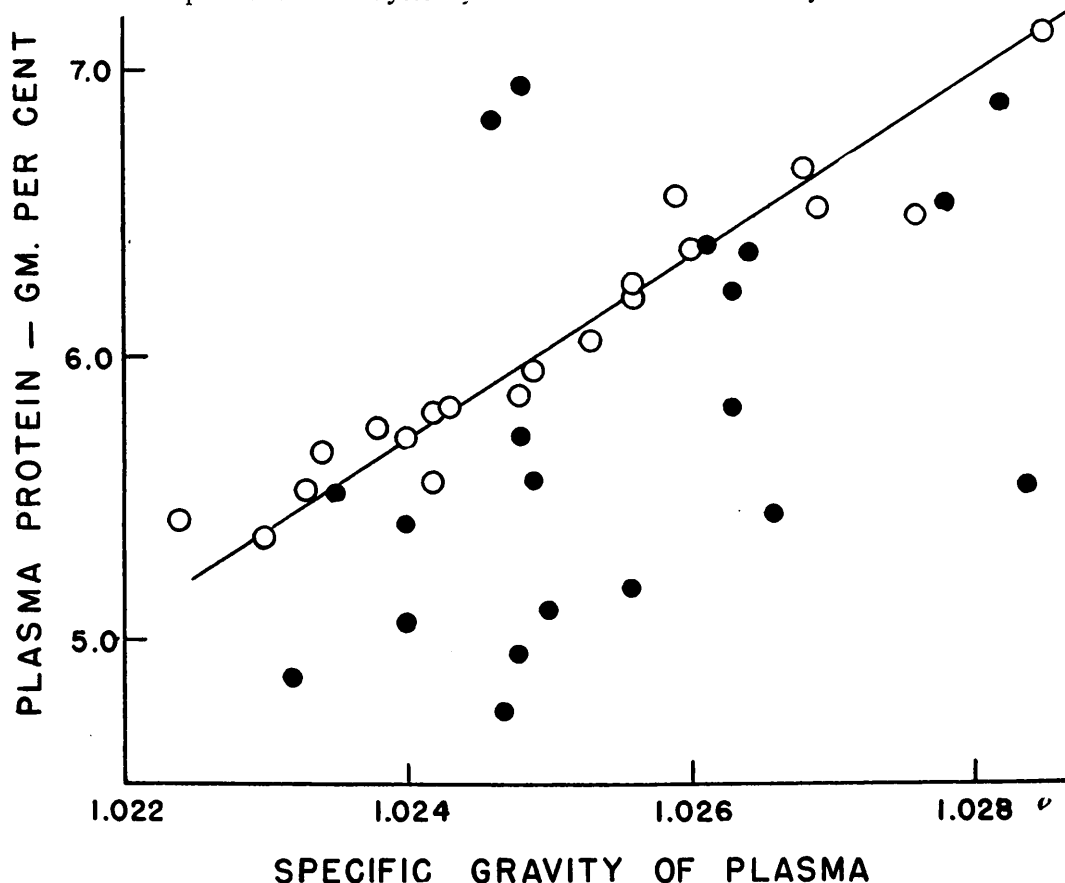


FIG. 1.

Concentration of protein (by Kjeldahl) in the plasma of normal rabbits (open circles) and of the same rabbits in gravity shock (solid circles) plotted against plasma specific gravity. Equation of line fitted to normal values is $P = 325 (G_p - 1.0064)$.

¹ Moore, N. S., and Van Slyke, D. D., *J. Clin. Invest.*, 1929-30, **8**, 337.

² Weech, A. A., Reeves, E. B., and Goetsch, E., *J. Biol. Chem.*, 1936, **113**, 167.

³ Barbour, H. G., and Hamilton, W. F., *J. Biol.*

Chem., 1926, **69**, 625.

⁴ Guthrie, C. C., *J. Lab. and Clin. Med.*, 1931-32, **17**, 1158.

⁵ Drew, C. R., Scudder, J., and Papps, J., *Surg., Gyn. and Obst.*, 1940, **70**, 859.

In order to determine whether the same relationship between specific gravity and protein concentration exists in rabbit plasma as in human and dog plasma, blood from 20 normal rabbits fed on Purina chow and later from the same animals suspended by their ears until they became unconscious from peripheral circulatory deficiency ("gravity shock")⁶ has been studied. The plasma of arterial heart blood was analyzed for protein by the micro-Kjeldahl method, for glucose by the Folin-Wu method as modified by Andes and Northup,⁷ and the specific gravity was determined by the falling drop method.

In Fig. 1 plasma protein before and during gravity shock is plotted against plasma specific gravity. The data for normal animals are well described by the line drawn through the open circles having the equation: $P = 375 (G_p - 1.0064)$, which is of the same order of magnitude as the equation reported

⁶ Allison, J. B., Cole, W. H., Leathem, J. H., Nastuk, W. L., and Anderson, J. A., *J. Biol. Chem.*, 1943, **147**, 255.

⁷ Andes, J. E., and Northup, D. W., *J. Lab. and Clin. Med.*, 1938-39, **24**, 529.

for human¹ and dog² plasma. For rabbits in gravity shock, however, the constant relation between specific gravity and protein concentration did not hold, as indicated by the solid circles, showing even greater divergencies than those found by Moore and Van Slyke¹ in human nephritic patients. The greatest differences below the line occurred in animals with high plasma glucose, as might be expected from the work of Simeone and Sarris.⁸ More data are needed to determine why the discrepancies exist, although there is indication that increased glucose and non-protein nitrogen are involved.

It is concluded that the linear relationship between protein concentration and specific gravity of normal rabbit plasma is essentially the same as that for human and dog plasma. For rabbits in gravity shock, however, the correlation of protein concentration and specific gravity is low. A similar low correlation may be found for other animals showing shock symptoms.

⁸ Simeone, F. A., and Sarris, S. P., *J. Lab. and Clin. Med.*, 1940-41, **26**, 1046.

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Pharmacology of Sodium Sulfanilylsulfanilate.*

HERMAN D. RATISH AND JESSE G. M. BULLOWA.†

From the Medical Service, Harlem Hospital, Department of Hospitals, New York, N.Y., and the Littauer Pneumonia Research Fund, New York University College of Medicine.

Sodium sulfanilylsulfanilate, a derivative of sulfanilamide, was first used therapeutically by Dochez and Slanetz¹ against a fatal infection in ferrets supposed to be due to and resembling dog distemper. MacIntyre and

Montmerie² in England employed this drug unsuccessfully in infections due to the distemper virus described by Carre-Laidlaw-Durkin. Oakley³ used it without benefit in experimental influenza. Coggeshall⁴ tested sodium sulfanilylsulfanilate in avian malaria. Hebb, Sullivan, and Felton⁵ recommended

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† Deceased November 9, 1943.

¹ Dochez, A. R., and Slanetz, C. A., *Science*, 1938, **87**, 142.

² MacIntyre, A. B., and Montmerie, R. F., *Brit. Med. J.*, 1938, **4032**, 875.

³ Oakley, G. L., *Brit. Med. J.*, 1938, **1**, 895.

⁴ Coggeshall, L. T., *Proc. Soc. Exp. Biol. and Med.*, 1938, **38**, 768.

⁵ Hebb, A., Sullivan, S. G., and Felton, L. D., *U. S. Pub. Health Rep.*, 1939, **54**, 1750.