

fets. Therefore we conclude that the use of irradiated whole wheat (muffets) in a rachitogenic diet fed to rats increases their resistance against infection.

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Experimental Edema—Further Observations on the Plasma Proteins and Blood Cholesterol.

LOUIS LEITER.

From the Lasker Foundation for Medical Research and the Department of Medicine, University of Chicago.

Since the first report, in 1928,¹ of the experimental production of edema in dogs by the method of plasmapheresis, further work has been carried out, the results of which are given in this preliminary report.

Edema has been produced in about 40 dogs, often several times in the same dog, whenever the plasma protein level has been maintained at about 3 gm. % or below. Above this level, edema disappeared promptly. There has been essentially no exception among the dogs used.

Several factors have been controlled. *Cardiac damage* has been ruled out by bleeding a series of dogs from the external jugular veins. *Starvation* alone, or with the daily administration of 1500 cc. of saline by stomach tube, gives rise to no significant change in the concentration of the plasma proteins nor to visible edema. *The alkalinity of the modified Locke's solution* used as a suspending medium for the erythrocytes injected into the dog plays no important rôle.

The *regeneration of the plasma globulin is much more rapid than that of the plasma albumin* and accounts for most of the sharp rise in the total protein when plasmapheresis is discontinued. This is shown best in the long experiments in which the plasma albumin level remains at about 1 or 1½% with relatively slight fluctuations up or down, while the plasma globulin curve shows striking variations depending upon whether or not plasma depletion is being carried out. The total protein curve parallels closely that for globulin. These results confirm the earlier work of Kerr, Hurwitz and Whipple.² It is easy to see, therefore, why the albumin/globulin ratio is

¹ Leiter, L., PROC. SOC. EXP. BIOL. AND MED., 1928, xxvi, 173.

² Kerr, W. J., Hurwitz, J. H., and Whipple, G. H., *Am. J. Physiol.*, 1918, xlvii, 356.

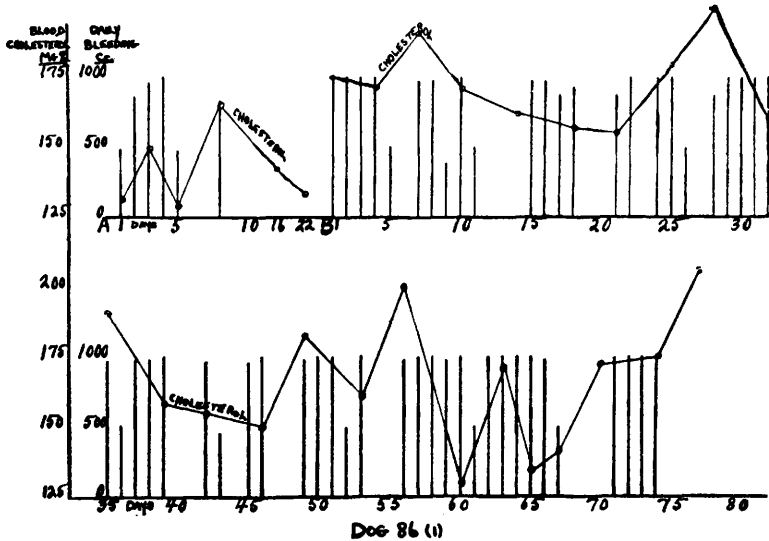


CHART 1.

The blood cholesterol curve during prolonged plasmapheresis. The vertical lines indicate the volume of daily plasmapheresis. Note the tendency for the blood cholesterol to rise in the intervals between active plasmapheresis.

usually reversed when there has been a long continued loss of plasma protein.

The *cholesterol level of the blood* is quite variable in the experiments of less than 2 or 3 weeks' duration. However, in the longer experiments (Chart 1), there seems to be a fairly definite cycle in the sense that the *cholesterol falls after several days of vigorous plasma depletion but rises sharply on cessation of plasmapheresis for a few days*. There is no persistent increase in the blood cholesterol. In this respect the clinical nephrotic syndrome presents the opposite picture.

These experiments bear no relation to the clinical nephrotic syndrome other than that they confirm the causal connection between low plasma proteins and a low protein, filtration type of edema fluid, which does not require the assumption of cardiac, renal, vascular or tissue colloid disturbance for its existence.