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The effect of fasting and of vitamin B deprivation on the chemical composition of rats' blood.

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The recent publication of data on the blood of pigeons in polyneuritis and starvation¹ suggested the desirability of publishing the data obtained on rats under similar conditions. The preliminary report² on the influence of fasting and of vitamin B starvation has been amplified and data have also been obtained on fasting rats to whom water (10 to 21 c.c. daily) was administered by stomach tube during the last days of the fast. Total solids were determined by an adaptation of Peters' method³ and the other constituents by the methods of Folin and Wu.⁴

From the summary given in the table it is apparent that the non-protein nitrogen of the blood of fasting rats is 30-40 per cent higher than that of normal animals, the increase being practically all in the urea fraction. Total dry matter, creatinine and creatine are slightly increased. Fasting rats that are given water *per os* during the last few days of their fast show normal values for non-protein nitrogen and solids. The blood of rats deprived of vitamin B also gives figures that are normal except that creatinine is at the fasting level and creatine slightly higher than the fasting figure; these differences have little if any significance in the present state of uncertainty with regard to blood creatine and creatinine determinations. Deprivation of vitamin B in contrast to fasting is not accompanied by an accumulation of nitrogenous end-products in the blood; whatever the ultimate cause of this increase may be in fasting, it is prevented by administration of water. The commonly observed disinclination of fasting animals to drink water was first shown by Bang⁵ to

¹ Palmer, L. S., and Hoffman, C. T., *Proc. Soc. Exp. Biol. and Med.*, 1922, xx, 118.

² Mattill, H. A., *Science*, 1921, liv, 176.

³ Peters, A. W., *J. Biol. Chem.*, 1919, xxxix, 285.

⁴ Folin, O., and Wu, H., *J. Biol. Chem.*, 1919, xxxviii, 91.

⁵ Bang, I., *Biochem. Z.*, 1916, lxxii, 119.

be responsible for the increased non-protein nitrogen and urea which he found in the blood of fasting rabbits. A similar condition seems to obtain in fasting rats leading to a relative concentration of the blood as contrasted with its dilution in the fasting pigeon. In this connection the results of Arima¹ on human blood are of interest in showing that the non-protein nitrogen in various forms of beri-beri is 32 to 67 mg. per 100 c.c.

AVERAGE ANALYSES OF RATS' BLOOD

Condition	Number of animals	Per cent. loss in weight	Total solids per cent.	milligrams per 100 c.c.				
				Total non-protein nitrogen	Urea nitrogen	Preformed Creatinine	Total Creatinine	Creatine
Normal	11		21.1	41	21	1.1	2.3	1.2
Without B	17	20-44	21.5	39	19	1.3	3.0	1.7
Fasting	10	22-37	23.2	67	40	1.3	2.8	1.5
Fasting with forced water intake	5	28-37	21.2	39	18			

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Antagonistic effects of insulin and thyroxin.

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Continued subcutaneous administration of thyroxin is known to produce hyperglycemia. In normal sheep the blood-sugar is raised from about 70 mg. to over 80 mg.

A single subcutaneous administration of thyroxin has only a slight effect on the blood sugar.

A single *subcutaneous* administration of insulin (10 units) produced no demonstrable effect within two hours after injection.

Intravenous administration of varying amounts of insulin (5

¹ Arima, E., 1916, abstracted in *Chem. Abstr.*, 1918, xii, 64.