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The Excretion of Vitamin B by Artificially Fed Infants.*

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Vitamin B in the urine and feces of animals and in human urine has been demonstrated by Muckenfuss,[1] Van Der Walle,[2] and Cooper.[3] According to Cowgill[4] the vitamin in the urine represents the amount ingested in excess of the needs of the animal, whereas that in the fecal excretion has been shown to be unabsorbed material.[5] The presence of Vitamin B in the urine of an animal, therefore, would seem to indicate the adequacy of the diet as a source of this factor; and the amount of the vitamin excreted in the feces should give some measure of the amount not available to the organism.

With such an interpretation in mind, a study of the intake and

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2 Van Der Walle, N., *Biochem, J.*, 1922, **16**, 713.

3 Cooper, E. A., *J. Hyg.*, 1914, **14**, 12.

4 Cowgill, G. R., Deuel, H. J., and Smith, A. H., *Am. J. Physiol.*, 1925, **73**, 106.

5 Dutcher, R. A., and Francis, E., PROC. SOC. EXP. BIOL. AND MED., 1923-24, **21**, 189; McCollum, E. V., Simmonds, N., and Becker, J. E., *J. Biol. Chem.*, 1925, **63**, 547; Salmon, W. D., *J. Biol. Chem.*, 1925, **65**, 457; Steenbock, H., Sell, M. T., and Nelson, E. M., *J. Biol. Chem.*, 1923, **55**, 399.

excretion of Vitamin B (the antineuritic factor) has been made on a group of 11 artificially fed infants and the retention of the vitamin determined. Thirty-three collections of urine and feces were tested. The food of all the children consisted essentially of cow's milk, a carbohydrate modifier free from Vitamin B, orange juice, and cod liver oil. In a few cases a Vitamin B containing extract was added to the feeding mixture in order to ascertain the influence of a larger ingestion. The determination of the amounts of Vitamin B in the ingested food and in the excreta was made by a biological assay on young rats of uniform weight and uniformly depleted of their vitamin stores. Each sample of the concentrated urine and dried feces was fed at various levels, from one to 6 rats being used at each level. Parallel experiments with yeast indicated no destruction of Vitamin B by the methods of concentrating and drying employed. A unit of Vitamin B was arbitrarily defined for the purpose of this study as the amount of the vitamin necessary to cause a young depleted rat weighing about 60 gm. to gain one to 2 gm. per day during the experimental period of 8 days.

Vitamin B, from 13 to 40 units, in the urine of the infants seems to indicate the adequacy of the cow's milk feeding mixtures tested as sources of this factor. The amounts of milk fed were comparable in some instances with the amounts usually recommended by pediatricians, 1.5 oz. per pound per day. With infants younger than 3 months, however, the milk ingestion was somewhat higher. The amount of Vitamin B retained per unit of weight (av. 8.4 units per kg.) is fairly consistent for all the infants whose vitamin balances have been calculated. The addition of 12 units of Vitamin B to the formula in the form of 30 cc. of wheat germ extract produced no significant change in the amount of the vitamin retained. The excretion of large amounts of Vitamin B in the feces was observed to be coexistent with a fatty stool. In general, the amounts of milk necessary to furnish Vitamin B for growth and to allow for losses through lack of absorption in the infants studied were found to be comparable with the amounts commonly prescribed for artificially fed infants, namely 1.5 oz. per pound of body weight. With the younger baby slightly larger amounts of milk would seem desirable. The data suggest that the Vitamin B requirement per unit of body weight is higher in early infancy and decreases with age.