

more light on the mechanism of the insulin hyperalimentation in normal animals,² of gaining information relative to the reason for appetite failure when this vitamin is deficient and the question of the necessity of vitamin B₁ for the conversion of carbohydrate to fat.^{4, 5, 6}

Four groups of six 60-day-old male rats were placed upon a diet* composed of vitamin-free casein 20, sucrose 71, standard (Osborne and Mendel) salt mixture 4 and dried and powdered autoclaved brewer's yeast free of vitamin B₁ 5 parts. In addition there were 10 mg vitamin B₆, 10 mg riboflavin and 20 mg nicotinic acid per 100 g of food. This diet was fed to groups A and B. Groups C and D were given the same diet with the addition of .05% thiamin chloride (Vit. B₁). Every second day each of the rats in all groups were given one drop of a fish liver oil containing 60,000 U.S.P. Vit. A units and 8500 U.S.P. Vit. D units per gram.

Figure 1 presents our experimental results. All of the groups gained well for some 12 days after which those (A and B) without the B₁ supplement commenced to lose weight. When the food intake was measured after 20 days the poor appetite of the B₁-deficient rats was very obvious. At this time the administration of protamine zinc insulin (Squibb's product in a strength of 40 u. per cc) was begun. Group D on an adequate diet were given 2 units subcutaneously morning and evening. Their food intake rapidly increased and their weight curve was obviously superior to their controls (Group C) on an adequate diet. A vitamin-deficient group which is not charted in Fig. 1 but which had a weight curve about like Group A were given the 2-unit insulin dose twice daily beginning at 81 days of age and all 6 rats in the group died in hypoglycemia within 3 days. Their appetite was not increased. The B₁-deficient group B were therefore given 1 unit of insulin each twice daily. There was again no increased food intake and 3 of the 6 rats died in hypoglycemia before the end of the 8-day period (89 days old) when vitamin B₁ administration was commenced. At this time the rats in both groups A and B were given subcutaneously 5 mg thiamin chloride in aqueous solution every day. The food intake and body weight of both groups increased at once. The insulin-treated group did not do much better than the others until the dose of insulin was increased to 2 units twice daily when they were 93 days old.

⁴ Whipple, D. V., and Church, D. F., *J. Biol. Chem.*, 1936, **114**, cvii.

⁵ Whipple, D. V., and Church, D. F., *J. Biol. Chem.*, 1937, **119**, cii.

⁶ McHenry, E. W., and Gavin, G., *J. Biol. Chem.*, 1938, **125**, 653.

* Their previous diet contained barely sufficient thiamin chloride for normal growth.

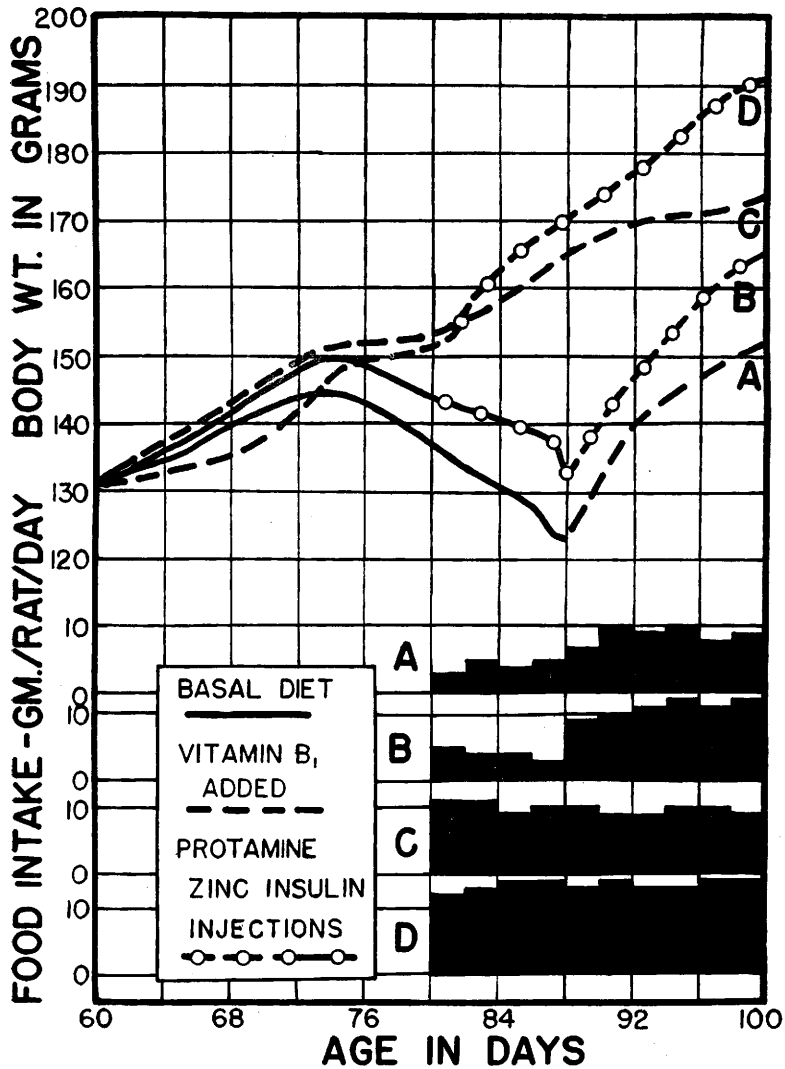


FIG. 1.

It is quite obvious from our experiments that vitamin B₁ in adequate amounts must be present in the organism if protamine zinc insulin is to lead to an increase in appetite. In normal rats we inclined toward the idea that the insulin hyperalimantation was a result of the depression of the blood sugar level.² Vitamin B₁-deficient rats, however, died in hypoglycemia without any increase in the food intake whatever. Our diet was devised to study the conversion of carbohydrate to fat and so is practically fat-free.

Rats suffering from vitamin B₁ deficiency have an aversion to both carbohydrate and protein⁷ and it is possible that insulin might influence the appetite for fat in B₁ deficiency but we have found the fat appetite less affected than that for carbohydrate in normal rats.

Summary. The administration of protamine zinc insulin which leads to a marked hyperalimentation in normal rats is without effect upon the depressed appetite of rats suffering from vitamin B₁ deficiency. These deficient rats succumb in hypoglycemia without an increase in their food intake when the insulin is administered. When thiamin chloride is given to B₁-deficient rats their appetite responds not only to the vitamin therapy but to protamine zinc insulin as do normal animals.

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Secretion of Radio-Strontium in Milk of Two Cows Following Intravenous Administration.*

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The composition of milk of cows varies markedly and is quickly influenced by the food ingested. To the pediatrician interested in infant nutrition this fact carries great significance. To determine, ultimately, the percentage of ingested calcium that is normally secreted in the milk of cows, the following preliminary experiment was made.

Method. Harold Walke, *et al.*,¹ have shown that the only radio-calcium isotope suitable for biological investigation is ²⁰Ca⁴⁵. However, the poor yield of this isotope and the softness of its emitted radiations prohibit, at the present time, its use as a tracer in large

⁷ Richter, C. P., Holt, L. E., Barelare, B., Jr., and Hawkes, C. D., *Am. J. Physiol.*, 1938, **124**, 596.

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¹ Walke, H., Thompson, F. C., and Holt, G., *Phys. Rev.*, 1940, **57**, 177.