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Determination of Vitamin B₁ Requirement of Infants by Means of Urinary Excretion of Thiamin.

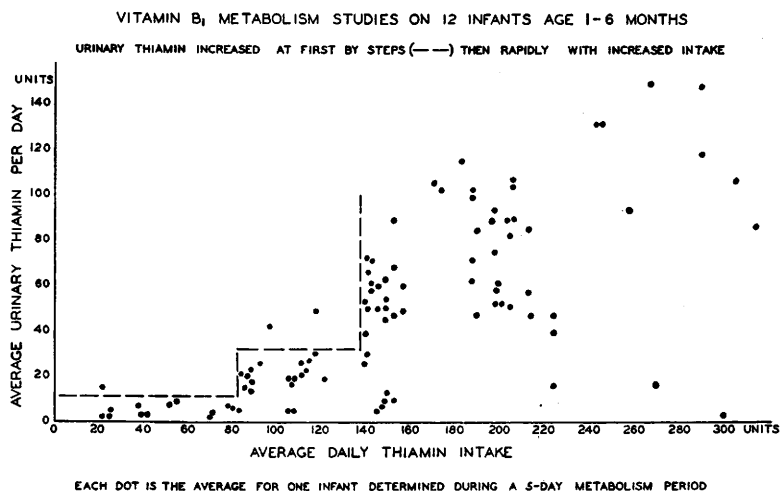
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In order to determine the level of vitamin B₁ intake which will give optimum conditions for development for the young infant, a series of 5-day balance studies have been conducted on each of 12 healthy male infants during the first 6 months of their lives. Thus far a total of 98 metabolism periods have been completed. The vitamin B₁ intake of the infants has been controlled either through the amount and type of milk fed each day, or by the additions of pure thiamin to the formulas. The range of total intake has been from 21 to 313 units of thiamin per day. Periodically for each infant, quantitative collections of urine and feces have been made for 5 consecutive days. These materials, as well as the various milks, have been assayed biologically for their thiamin content.

It was apparent early in the study that infants had absorbed thiamin from milk formulas very completely since only small quantities of the vitamin were excreted in the stools and in general the amounts of thiamin excreted in the urine increased with increases in intake. In the accompanying chart the amounts of urinary thiamin have been plotted in relation to the intake. A study of these plotted results reveals 2 shifts in the pattern of urinary excretion which seem significant. Below 80 units of intake per day a constantly low quantity of thiamin was excreted in the urine. At 140 units or more of intake, the thiamin appeared to be excreted in much larger amounts as higher levels of the vitamin were fed. The average urinary thiamin for successive increments of 20 units of intake were as follows: 6, 6, 4—19, 22, 34—47, 104, 77, 76, 34, 118, 83, 90, 96. The 2 bars are placed in the sequence at 80 and 140 units of intake per day. These data seem to indicate that 80 units may be the minimum requirement, and 140 units the maximum amount needed for this age infant. Perhaps the range from 100 to 150 units of thiamin may be considered the optimum intake for a young healthy infant, and that above this level of ingestion excess vitamin is excreted rapidly in the urine. The optimum for the baby, however, cannot be determined by economy of vitamin alone, and infants may require a considerable continuous wastage.

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In order to determine thiamin requirements more exactly we have also studied the amounts of cocarboxylase found in the blood of young infants. Preliminary results show that at an intake increasing from 42 to 56 units of thiamin per day during 9 weeks of study, one infant was not able to maintain the level of his blood vitamin, whereas a second infant did maintain the level of cocarboxylase in his blood when given an intake ranging from 49 to 58 units of thiamin per day over the same period. This second infant, however, was the best infant we have ever studied so far as utilization of nutrients is concerned, and it is probable that the minimum requirement for the average infant is above the level of 60 units of thiamin per day which these infants received. These blood data tend to substantiate the conclusion based on urinary excretion that 80 units of intake represent the minimum requirement. Further investigations are now under way to determine the lowest thiamin intake which is compatible with health, and also the optimal amounts of vitamin B₁ for the best development of the infant.

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Buccal Absorption of α -Estradiol in Propylene Glycol.

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In the treatment of estrogen deficiency states, it is frequently necessary to administer estrogens for prolonged periods of time.