

animals the thyroid was found to average 0.23% of the body weight, whereas the thyroid of the young of the animals receiving high protein diets averages 0.40% of the body weight. When starch free yeast was added to the high protein diet, the thyroid averaged 0.22% of the body weight. When low protein was substituted for high protein in the basal diet, the thyroid averaged 0.28% of the body weight.

The young of animals receiving low protein diets to which was added respectively glycine and alanine, amino acids known to stimulate metabolism, developed symptoms comparable to those of the young of rats receiving high protein diets. The influence of these additions on the thymus and thyroid also was similar. The thyroids of the young of the animals receiving glycine averaged 0.40% of the body weight whereas those of the young of the animals receiving alanine averaged 0.30% of the body weight. Glutamic acid, known to be low in its stimulating effect, caused no hypertrophy; the weight of the glands of the young receiving this averaged 0.23% of the body weight.

The average weight of the thymus gland of the young of rats receiving the high protein diet without added antineuritic vitamin was 0.11% of the body weight. When Vitamin F was added the thymus averaged 0.43% of the body weight.

The addition of glycine and alanine to the low protein diets resulted in an atrophied thymus (0.12% of the body weight). With Vitamin F additions the glands averaged 0.42% of the body weight. The results with glutamic acid, on the other hand, compared with those of the low protein diets.

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### Influence on Development of Suckling Young of Addition of Certain Amino Acids to Diet of Mother During Lactation.

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In studies pertaining to the influence of the diet of the mother on the development of the suckling young of rats, it was shown that a high percentage of protein and inadequate amounts of Vitamin F fed during the lactation period result in certain untoward symp-

toms in the young.<sup>1</sup> These symptoms were made manifest by extreme nervousness, muscular incoordination, sharp cries, and violent convulsions. In many cases, death followed.

In order to determine the cause of these abnormal conditions in the suckling young, lactating rats were fed a series of diets in which the amount of protein as well as the kind of protein differed. The amount of the antineuritic vitamin at the different protein levels also was varied. In some cases the Vitamin F containing substance was autoclaved at a definite pH to rule out the possible influence of other substances contained therein. Other groups of animals received low protein diets to which were added certain amino acids: glycine and alanine known to have a stimulating effect on the metabolic process, and glutamic acid, which has been shown to have no influence. The effect of Vitamin F additions with these amino acid diets also was tested.

The untoward symptoms in young of the animals receiving the low protein diets with the addition of glycine and alanine respectively were comparable to those of the young of mothers receiving high protein diets; whereas the young of the animals receiving the low protein diets with glutamic acid additions developed normally, as did the young of animals receiving the low protein diets with glycine to which yeast was added.

From these results it seems probable that the need for more antineuritic vitamin when high protein diets are fed is due to the increased metabolism resulting from the action of certain of the amino acids contained therein.

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<sup>1</sup> Hartwell, G. A., *Biochem. J.*, 1922, xvi, 825; 1925, xix, 227; Nelson, M. P., *J. Home Econ.*, 1926, xviii, 383; Daniels, A. L., and Brooks, L., *Proc. Soc. Exp. Biol. and Med.*, 1927, xxv, 161; Daniels, A. L., Giddings, M. L., and Jordan, D., *J. Nutrition*, 1929, i, 455; Lawrence, M. R., *Dissertation*, State University of Iowa, 1929.