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3666

The Composite Nature of Vitamin B.

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Chick and Roscoe[1] have recently reviewed and amplified the evidence that vitamin B involves two factors of importance for young rats, one thermolabile, the other stable under several hours autoclaving at 125°. Seidell[2] has shown that the stable factor does not noticeably contribute to the well-being of pigeons on a polished rice diet. In this paper we present evidence confirming these findings and throwing some further light on the multiple nature of vitamin B.

We used as supplements (1) aqueous extract of brewers yeast, (2) fullers earth activated with the same extract with interposition of a collodion membrane, as described in a forthcoming paper in the *Journal of Biological Chemistry,* and (3) brewers yeast which had been autoclaved for 6 hours at 125°. As a basal diet we used a typical synthetic preparation, the No. 107 diet of Sherman and Spohn.[3] In all cases the diets were fed *ad libitum,* and the supplements separately, so as to insure their complete consumption. Identical lots of material were used throughout the experiments tabulated.

We have been led to conclude: (1) That the dietary requirements of adult pigeons are distinctly different from those of young rats, since identical diets gave contrasting results, *cf.*, Exp. 5 and 6. (2) That young rats require two B factors, one of which is of little or no consequence to pigeons. (3) That, on the other hand, pigeons require something not required by young rats, since normal weight of pigeons was not maintained on a diet that supported normal growth in rats. See Exp. 6. This third unknown factor required by pigeons but not by rats is present in whole wheat, for birds assume a higher and normal level of weight when fed whole wheat.

TABLE OF EXPERIMENTS

With Synthetic Diet of Sherman and Spohn

Exp. No.	Animal	Supplement	Daily Dose Grams	Result
1	Pigeon	Yeast extract	.2–.4	Decline to about 80–90% of normal weight. Healthy except for slight dejection of attitude.
2	Rat	Yeast extract Autoclaved yeast	.03 1.0	Normal growth.
3	Rat	Activated fullers earth	.01	Scanty growth followed by slow decline of several weeks duration.
4	Pigeon	Ditto	.01	Same as Exp. 1.
5	Rat	Activated fullers earth Autoclaved yeast	.01 1.0	Normal growth.
6	Pigeon	Ditto	"	Same as Exp. 1.
7	Rat	Autoclaved yeast	1.0	Scanty growth, followed by decline, polyneuritis and death.
8	Rat	None		Rapid decline, polyneuritis and death.
9	Pigeon	"		Decline in weight to 60 to 70% of normal, followed by polyneuritis and death in 30–40 days.

The same experiments have been performed with pigeons, substituting polished rice for the synthetic diet. The results were essentially the same except that the birds receiving no supplement died sooner. We believe this is evidence that our synthetic diet was not quite free from the thermolabile B factor, and suspect this defect has often crept into the work of others, since complete removal by extraction processes is extremely difficult, if not impossible. However, the absence of the third unknown factor in adequate amount in polished rice is clear. The failure to maintain weight is not due to a partial deficiency of the thermolabile antineuritic factor, for the use of 8 times as large doses of the activated fullers earth did not bring the weight up to normal.

This third factor is evidently not vitamin A or D, which were abundantly present in the synthetic diet in the form of butter and cod liver oil. It is improbable that it is an ash constituent, in view of the salt mixture in the synthetic diet. It may be of the nature of vitamin E, since no very rich source of E was present in abundance. We are endeavoring to ascertain the nature of this third factor.

[1] Chick, H., and Roscoe, M. H., *Biochem. J.*, 1927, xxi, 698.

[2] Seidell, A., *Bull. Soc. Chim. Biol.*, 1926, viii, 746.

[3] Sherman, H. C., and Spohn, A., *J. Am. Chem. Soc.*, 1923, xlv, 2720.

3667

Effect of Thyroparathyroidectomy on the Jaundiced Animal.*

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During the course of some experiments on jaundiced puppies we noted a fairly progressive lowering of the blood serum calcium, which, in several instances fell to the tetany level.[1, 2] None of the animals evinced the slightest evidence of increased neuromuscular excitability; on the other hand, some degree of apathy was the rule. It was thought that either some of the circulating biliary constituents or some one or more intermediary products resulting from the perversion of liver function had raised the threshold of nervous excitability, or, that the parathyroids had assumed an added function and were playing some rôle in keeping the animals out of tetany. Apart from such intercepting factors there was every reason to expect the early precipitation of tetany in very young animals with extensive morphologic changes in the liver, a markedly disturbed intestinal condition and in addition a lowering of the blood serum calcium. To remove suspicion from the parathyroids, a series of animals, young and adult, were, after a period of jaundice lasting 16 to 18 days, induced by division of the common duct between ligatures, subjected to thyroparathyroidectomy. Blood calcium determinations were made in the normal, jaundiced and parathyroprivic states.

In the first group of experiments puppies, 8 to 10 weeks old, were used. Only slight symptoms of tetany were noted and in more than

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