

on the blood-content alone. It is conceivable, however, that all of the placental fluid is comparable to blood serum and similar to it in its antibody content. It is questionable, therefore, whether it will be necessary to postulate other than humoral immunity transmitted from the mother to the placenta to explain the striking results recorded with placental globulin extract.

McKann's studies were nearly all done in hospital exposures, which according to the recent report of Schick and Karelitz,⁵ usually yields a more optimistic or exaggerated impression of the actual value of a serum. If, therefore, the dosage of placental extract will have to be larger for children intimately exposed to measles, as is the case in their homes, it is possible that their results will more nearly approximate those obtained with blood of immune adults.

Conclusions. 1. The globulin of the blood of measles immune adults carries a factor effective in measles prophylaxis. 2. This globulin extract is at least as effective as the blood serum from which it was obtained. 3. Although no direct proof is offered, suggestions are made which might explain the striking results obtained with placental globulin extract, on the basis of maternal and fetal blood contained in the placenta.

7323 C

Effect of Type of Carbohydrate on Vitamins B and G Potency of Feces Voided by Rats.*

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In a previous publication from this laboratory¹ the danger of coprophagy, as it affects the assay of vitamins B and G, was discussed. Similar observations had been reported by Roscoe.² More recently Booher and Kaneko³ have submitted data which led them to conclude that their assays for vitamin B (B₁) were not vitiated by coprophagy. The last mentioned investigators used raw corn

⁵ Karelitz, S., and Schick, B., *Wien. Med. Woch.*, 1932, **45**.

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¹ Guerrant, N. B., and Dutcher, R. Adams, *J. Biol. Chem.*, 1932, **98**, 225.

² Roscoe, M. H., *Biochem. J.*, 1931, **25**, 2056.

³ Booher, L. E., and Kaneko, T., *Proc. Soc. Exp. Biol. and Med.*, 1932, **30**, 69.

starch as the source of carbohydrate. Since Roscoe had reported that she was unable to obtain characteristic growth responses from coprophagous rats when raw corn starch served as the source of carbohydrate, it seemed highly probable that the type of carbohydrate might be an important factor worthy of further study. This possibility has been further suggested by data obtained in this laboratory during a somewhat related investigation in which it was found that the quantity of vitamins B and G required to produce a unit increment of growth was considerably greater when sucrose was fed as the source of carbohydrate than it was when dextrinized corn starch was used.

The experiments here described were initiated to determine the extent to which growth responses in coprophagous rats could be affected by substituting carbohydrates of various types in the usual basal ration deficient in vitamins B and G. Among the carbohydrates under investigation at present are: corn starch, dextrinized corn starch, glucose, sucrose, and lactose. While the results to date are insufficient for a complete statement, the differences obtained with diets containing sucrose and corresponding diets containing dextrinized corn starch are sufficiently marked to justify a preliminary note at this time.

The experimental technique employed was similar to that reported elsewhere.¹ The feces voided were removed from the cages daily, placed in a separate feed container and returned to the cage of the animal which voided them or to that of another designated animal. The growth records of a few typical animals are given in Chart 1.

Animal 8904, weight 40 gm., received the sucrose-containing diet (353), unsupplemented. This animal made about the same increase in weight during the first week of the experiment that is usually observed when young animals receive this diet. During the remainder of the experimental period, there was a consistent loss in weight. The animal manifested its first paralytic symptoms on the 26th day and died on the 31st day.

Animal 8894, weight 43 gm., also received the sucrose-containing diet unsupplemented. The increase in body weight during the first week (8 gm.) was somewhat greater than that usually obtained while using this diet. During the following 2 weeks there was a gradual loss in weight. Beginning on the 22nd day, the feces of this animal were collected daily, placed in a separate food-container and returned to the cage. These feces were consumed quite readily during the first few days, after which the animal refused to ingest

appreciable amounts. In the meantime the animal continued to lose weight and manifested slight paralytic symptoms. Starting on the 52nd day and continuing through the 66th day, this animal was given one-half of the feces voided daily by its litter mate (animal No. 8893), which at this time was receiving a dextrin-containing diet (349). Animal 8894 consumed these feces very greedily. During this 14-day period, the paralytic symptoms disappeared and the

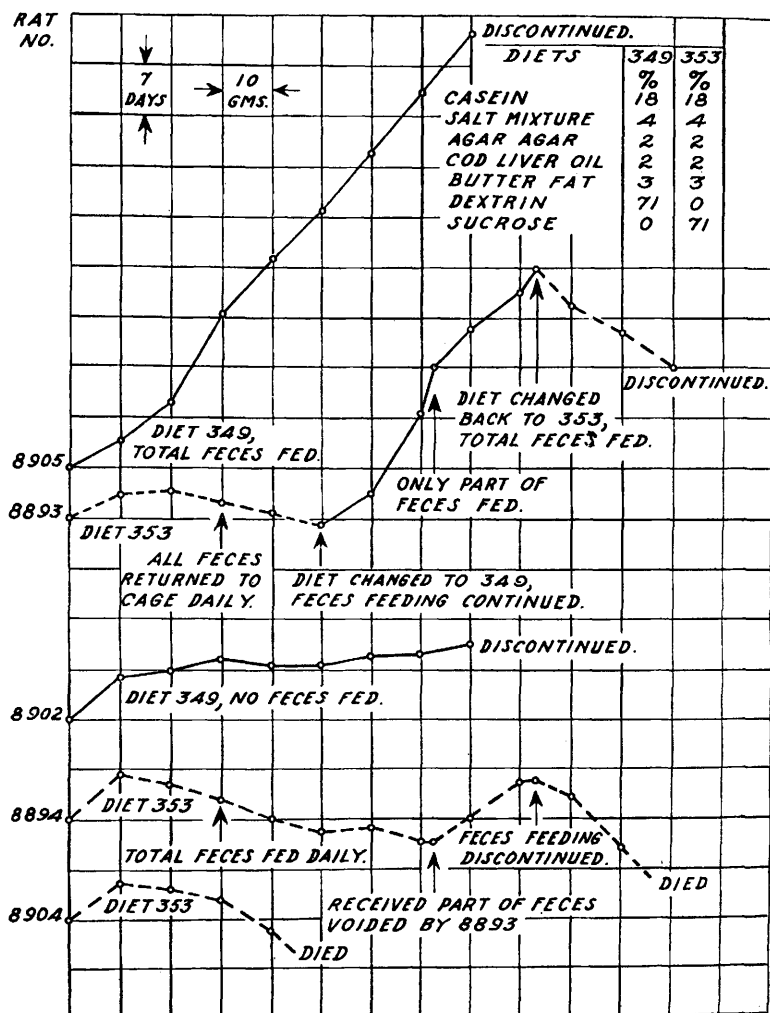


CHART I.

Showing typical growth responses made by young rats when fed vitamin B-complex deficient diets, unsupplemented and supplemented with feces voided by animals receiving the respective diets. The 2 diets differed in composition only in respect to the type of carbohydrate used.

animal increased 12 gm. in weight. On the 66th day feces feeding was discontinued and the animal lost weight gradually and died on the 81st day.

Animal 8902, weight 40 gm., received the dextrin-containing diet unsupplemented throughout the experimental period. During the first 4 weeks its deportment was quite comparable to that which is usually obtained on this diet. There were some indications, however, that during the last 4 weeks this animal was practicing a slight degree of coprophagy. This condition seems to be extremely difficult to avoid when the diet contains a relatively high percentage of dextrinized corn starch, especially when the experimental animal has been over-depleted of its vitamin B stores. This animal was removed from the experiment at the end of the eighth week.

Animal 8893 (litter mate of 8894), weight 40 gm., received the sucrose-containing diet (353), unsupplemented, during the first 3 weeks, and made a very typical growth response during this time. Starting with the 21st day, all feces voided by this animal were returned to the cage daily. From the 21st to the 35th day the animal continued to lose weight. On the 35th day the diet was changed from the sucrose diet to the dextrin diet, and the feces feeding was continued. During the next 17 days the weight of the animal increased 32 gm. Starting with the 52nd day and continuing for 2 weeks, only one-half of the feces voided by this animal was returned to the cage, the other half of the feces being fed to animal 8894 during this period. This animal (8893) continued to increase in weight so long as it received the dextrinized corn starch diet supplemented by its own feces. On the 66th day the diet was changed back to diet 353, and the feeding of all feces was continued from this date. Eighteen days later, the animal was removed from the experiment, after it had lost 19 gm. in weight.

Animal 8905 (litter mate of 8902 and 8904), weight 42 gm., received diet 349 throughout the feeding period. Starting with the second day of the experiment, all of the feces were returned to the cage daily. At first there was some hesitancy on the part of the animal to consume the entire supply of feces but this lack of appetite had completely disappeared by the fifteenth day. The animal made a total gain of 86 gm. during the 8 weeks' observation, and at the end of this time appeared to be normal in all respects.

Summary. Data are presented which indicate that the type of carbohydrate used in vitamin B and G deficient diets is an important factor in determining whether or not coprophagy will vitiate results when accurate assays of vitamins B and G are desired. Coprophagy

appears to be of little consequence when sucrose is used as the sole source of carbohydrate, while dextrinized corn starch offers the possibility of introducing serious errors and incorrect conclusions if rats resort to coprophagy when this carbohydrate is used.

Experiments are now in progress in which an attempt is being made to find an explanation for the results described, and the study is being extended to include other types of carbohydrates.

7324 C

Death of a Yeast Culture, as Registered by the Electric Resistance.

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The method used for estimating the vitality of tissues by measuring their electric resistance has been applied, in the present investigation, to a suspension of yeast heated gradually until all the cells were killed.

A suspension of 3 gm. of yeast (Fleischmann's yeast) in 3 gm. of a N/5 solution of NaCl, was heated from 15°C. to 93° and then cooled to 15° in an Ostwald's conductivity cell immersed in a water bath, and the electric resistance of the suspension was taken at each degree. The time between 2 readings was one minute. A microphone Hummer, working on a 6 volts battery, delivered the alternating current of 1000 cycles, used in the conductivity bridge. The suspension was stirred before each measurement by moving the electrodes up and down. Previous tests showed that the concentration N/5 did not affect the resistance of the cells to an appreciable amount.

The results, plotted on the curve (Fig. 1), show:

1. From 15° to 62° and from about 60° to 15° the resistance behaves like the resistance of a salt solution, and the curve coincides with the resistance curve of a salt solution of convenient concentration.

2. From 62° to 67° the resistance falls abruptly. This irreversible drop is probably due to the death of the majority of the cells.

3. From 67° to 93° and from 93° to about 60° the curve shows a resistance higher than would be expected from a salt solution; at about 60° it coincides again with the typical curve of such a solution. This phenomenon suggests that above 67° the few surviving cells are killed.