It seems, therefore, that ingestion of carbohydrates makes the organism in some way more susceptible to insulin; whereas absence of carbohydrate obtained by starvation, or administration of carbohydrate-free diet, decreases the hypoglycæmic effect of insulin.

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Fate of non-native varieties of colon-aerogenes in intestinal tracts of young chicks.

MILDRED WINCHESTER (Introduced by Emerson Megrail).

[*From the Department of Hygiene and Bacteriology, Medical School, Western Reserve University, Cleveland, Ohio.*]

Starting with sixteen 24-hour-old chicks, the feces were examined for the presence of citrate and non-citrate-using members of the colon-aerogenes group of bacteria for a period of one week. No growths of colon organisms having the ability to utilize citrate as a sole source of carbon were obtained, but small numbers of citrate-using *B. aerogenes* were found in the feces of nearly all of the chicks.

Eight of these chicks were fed "non-fecal" (citrate-using) *B. coli* at the rate of two agar slants per chick per day, the organisms being washed off into the milk at the morning and night feedings. All bacteria used were growths from single cell isolations, the coli being soil organisms of the Koser type,[1] and one culture was furnished by Dr. Koser.

During the first three weeks the experiment was conducted under sterile conditions in so far as the colon-aerogenes group was concerned; all food was thoroughly pasteurized, all dishes were sterilized at each feeding, and the chicks were kept in sterile cages containing sterile sand and a layer of sterile shavings. During the latter part of the experiment, sterilization was discontinued since the number of colon-like organisms present in the food, etc., before sterilization was too small to make any difference in the enormous amounts fed to the chicks.

[1] Koser, S. A., *J. Bact.*, 1924, ix, 59.

Specimens of feces in the first period were obtained aseptically. A suspension of a portion of the feces from each chick was made in sterile broth, and from this, eosin-methylene-blue-crystal violet-agar[2] plates were streaked. (This medium gave a very sharp differentiation between colon and aerogenes types, but no satisfactory test as between colon types using or not using citrate.) From the colon colonies which appeared on these plates, ten were picked at random and transferred to citrate medium. In the latter part of the experiment no precautions were taken in regard to sterilization with no apparent change in results.

During continuous feeding of these large amounts of citrate-using *B. coli* over a period of three months, they appeared in the feces to the extent of 26 per cent of the colonies examined. Several times during this period they disappeared, sometimes for four or five days. Their disappearance occurred more frequently during the third month of the experiment than at first. Upon cessation of feeding, however, they disappeared *entirely,* always within three days of the time the feeding was discontinued.

Five control chicks, kept under normal conditions and fed on unsterilized food without addition of citrate-using bacteria, were run at the same time, but at no time during the experiment were any colon organisms found using citrate.

Three additional chicks were used in an attempt to supplant *B. coli* with *B. aerogenes* in the intestinal tract by consistent feeding of these organisms. The feeding of a non-native *B. aerogenes* produced no relative increase in the numbers of these organisms. The feeding of a native type—found normally in the feces of the chicks in small numbers—resulted in raising the number of organisms to 40 per cent of all colonies examined. These, like the citrate-using *B. coli,* disappeared almost immediately when the feeding was discontinued.

Thus, although it is apparently possible, by persistent feeding, to implant temporarily these citrate-using bacteria in the intestinal tracts of young chicks, it is merely a transitory thing, since the organisms disappear entirely as soon as the feeding is discontinued, and even disappear intermittently while the feeding is in progress. It is evident, therefore, that these non-native types of bacteria meet with some adverse conditions in the intestine of the

[2] Skinner, C. E., and Murray, T. J., *J. Infect. Dis.,* 1924, xxxiv, 585.

chick. These conditions would appear to be due to one of three factors:

(1) An *inhibition* of the organisms owing to an unfavorable environment or to antagonistic action of other organisms;

(2) The *destruction* of the bacteria due to (a) the influence of an abnormally high temperature on these soil organisms; (b) the chemical activities in the body of the chick; (c) the chemical activities of other organisms.

(3) The *transformation* of the citrate-using bacteria into the non-citrate using type in the intestinal tract of the chick.

Of these factors, the temporary inhibition of the organisms appears to be the least probable; a month after inoculation of a known mixture of the two types into citrate medium, both are found viable when transferred to eosin-methylene-blue plates, thus eliminating any shorter time factor; yet when similar transfers are made from negative citrate tubes, no growths of citrate users develop. Investigation of these separate points in now in progress in the hope of obtaining more definite information concerning the fate of the citrate-using bacteria in the intestinal tracts of young chicks.

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Chronic ulcerations in the dog's stomach produced by x-ray.

JOHN A. WOLFER (Introduced by Lester R. Dragstedt).

[*From the Laboratories of Surgery and Physiology, Northwestern University Medical School, Chicago, Ill.*]

Progress in the study of gastric ulcer has been decidedly delayed by the fact that it has been impossible to produce, experimentally, chronic ulcerative lesions in the stomach of the lower animals, notably in the dog. Innumerable attempts have been made in the past twenty or more years, and, with one possible exception, they have all been failures. In certain instances, Dragstedt was able to produce a chronic ulcer by injecting 4 per cent silver nitrate solution beneath the mucosa, and then stitching in and out through this area, using non-absorbable material.