THE VARIATIONS IN THE CONTENT OF SUGAR IN THE BLOOD

Alimentary glycosuria, as exhibited in the renal excretion of sugar when undue amounts of carbohydrates are ingested by persons who fail to manifest this symptom under ordinary conditions of diet, has long been recognized and investigated. The prominence which the clinical estimation of the sugar-content of the blood has assumed in recent months, and the diagnostic importance which has been attached to the variations in this blood-constant as a possible index of incipient metabolic disorder, have seemed to call for a careful determination of the precise effect which the ingestion of carbohydrate may exert in altering the quantum of blood-sugar under well controlled conditions in otherwise healthy persons. The determination of normal values and physiologic deviations from them is always essential as the rational beginning in the establishment of a new scheme of diagnostic procedure. Such an undertaking has lately been carried out in the medical clinic of the University of Copenhagen by Dr. Jacobsen.[1] Estimations were made after comparatively brief successive intervals in the same persons who had taken various substances in suitable quantities three or four hours after breakfast. It is well known that healthy persons frequently exhibit glycosuria after the ingestion of from 150 to 200 gm. of dextrose under similar conditions — and this is usually taken as an index of alimentary glycosuria. In contrast with some earlier studies the Danish investigator has observed an unmistakable hyperglycemia in every instance after ingestion of 100 gm. of dextrose; in some instances glycosuria likewise appeared simultaneously. In view of this fact, Jacobsen points out that a mild transient glycosuria under such circumstances is no longer to be looked on as a diabetic symptom.

Comparable quantities of starch administered in the form of bread likewise led to hyperglycemia. The increase in the percentage of sugar was quite as pronounced, in some cases, as that which occurred after the introduction of glucose; but the onset of the hyperglycemia was slower, as might be expected, in view of the slower liberation of sugar by the digestive processes. Fat or protein, in contrast with glucose or starch, were without effect on the level of the sugar in the blood; but when starch was administered along with fat the degree of the alimentary hyperglycemia was relatively mild. The explanation of the inhibitory effect of the fat on the tendency to hyperglycemia is presumably to be sought either in the fact that the presence of the fat mechanically interferes with the ready digestion of starch and consequent liberation and absorption of sugar, or that fat retards the discharge of contents from the stomach and delays absorption in this way.

Effects of a similar sort were observed also in the blood of diabetics fed as indicated before. There is a tendency, however, for a greater increase in the blood-sugar content to assert itself in the abnormal than in the normal persons after an identical intake of carbohydrate; and the same increment of blood-sugar in diabetics is far more likely to lead to glycosuria. In healthy persons, for example, the content of blood-sugar may be raised to 0.16 or 0.17 per cent., without inducing an elimination of glucose. In diabetics the consequences are exaggerated in every direction. The possession of these newer data will serve to orient us better in the direction of successful diagnosis on the basis of the information to be obtained for the estimation of the sugar-content of the blood under known or controlled conditions of diet.

1. Jacobsen, A. T. B.: Untersuchungen über den Einfluss verschiedener Nahrungsmittel auf den Blutzucker bei normalen, zuckerkranken und graviden Personen, Biochem. Ztschr., 1913, lxvi, 471.

OVARIAN TRANSPLANTATION

In 1909 and 1911, W. E. Castle and John C. Phillips[1] reported successful experiments made by them in ovarian transplantation in guinea-pigs. They now report a third successful transplantation as corroborating their theories and give the conclusions drawn from their observations. The conservatism of their previous reports renders their deductions especially significant.

In their first successful experiment the ovaries from a black guinea-pig were transplanted into a previously castrated white one, which, during one year, produced six black-coated young like the animal from which the ovaries were obtained, and entirely different from the white mother-pig. The most careful investigation disclosed no other factor than the transplanted ovaries which could have caused the phenomenon.

In the second successful experiment the color-factors were repeated. The ovaries from a colored guinea-pig were grafted on an albino, which bore a brown-eyed cream young one to an albino mate. The characteristics of the other young born to the albino pair were exactly such as would have been produced had the colored animal been mated with the albino male.

In the third successful experiment,[2] a different factor obtained. The animals mated were alike in all genetic features. The mother guinea-pig, of an agouti hair-pattern—the upper part of the body brownish with a mixture of red and black, the belly yellowish—received the ovaries from a light cinnamon animal. The reported result shows that "the sojourn and development in the body of a brown animal of an ovary taken from a cinnamon animal does not seem to have altered in any respect the initial genetic possibilities of the germinal substance."

The conclusion arrived at is that these three cases furnish substantial evidence in favor of Weismann's theory that in the higher animals the germinal sub-

1. Castle, W. E., and Phillips, John C.: A Successful Ovarian Transplantation of the Guinea-Pig and its Bearings on Problems of Genetics, Science, New Series XXX, 312; On Germinal Transplantation in Vertebrates, Publication 144, Carnegie Institution, Washington, 1911.

2. Castle, W. E., and Phillips, John C.: Further Experiments on Ovarian Transplantation in Guinea-Pigs, Science, Nov. 28, 1913, p. 783.

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