

stant until the galactose concentration in the tissues and the blood has risen to a certain definite level. On account of differences in the rate of absorption this level is reached sooner and is higher when galactose is being absorbed alone than if galactose is being absorbed from the galactose-glucose mixture. These differences in the rate of absorption have an influence on the amount of galactose utilized per hour. The ratio in the rate of absorption is of the order 100:41. Of galactose when absorbed alone 52 mg. are utilized per hour; of galactose from the galactose-glucose mixture 34 mg. are utilized per hour. This bears out the fact already established for glucose (Woodyatt, Sansum and Wilder²) that for an increment in the rate of supply of sugar only a portion of the extra amount supplied is lost in the urine. In other words, the amount of galactose utilized per unit of time increases with increasing rates of absorption.

Summary. After the establishment of an initial equilibrium, due to the penetration of galactose into the tissues, the rate of excretion and utilization of galactose remains constant from hour to hour. The amount of galactose utilized per unit of time increases with increasing rates of absorption.

¹ Cori, C. F., *J. Biol. Chem.*, 1926, lxx, 577.

² Woodyatt, R. T., Sansum, W. D., and Wilder, R. M., *J. Am. Med. Assn.*, 1915, lxx, 2067.

3871

Residual Reduction in Blood Filtrate After Treatment with Colon Bacillus.

ROGER S. HUBBARD AND CATHERINE B. ALLISON.

From the Clifton Springs Sanitarium and Clinic, Clifton Springs, New York.

To 5 cc. portions of Folin-Wu filtrate were added 10 drops of a solution containing 6.4% NaH_2PO_4 and 17.9% Na_2HPO_4 . These were then inoculated with a strain of an organism culturally and morphologically typical of *Bacillus coli communis*. After 24 to 48 hours incubation the residual reduction was determined by the technique of Folin and Wu¹ modified as follows: Several dilute standards ranging from an equivalent of 0 to 0.020% in terms of the original blood were treated in the same manner as, and simultaneously with, the unknown solution. The color of the latter was then compared directly without dilution and without the aid of a colori-

meter with the color given by the standards. The readings of about 100 determinations on whole blood ranged from slightly below 0.010 to somewhat over 0.020%, with the greater part of the figures lying between 0.015 and 0.020%. Plasma values were one-third to one-fifth of those obtained without removing the cells. If varying amounts of solution were used together with sufficient water to make the volume 2 cc., the results were proportional to the amount of filtrate present. When glucose was added to such incubated material immediately before the analysis the sum of the added glucose and the residual reducing power was found by the standard technique of Folin and Wu.² If glucose was added and incubation continued the added glucose was destroyed in 12 to 18 hours. If the incubation of such filtrates was continued for several days there was sometimes a very slight further decrease in reducing power which may have been associated with contamination, as it was not observed when the solution was autoclaved before inoculation. In solutions of pure glucose similarly treated the reducing power decreased much more slowly and the opacity indicated the presence of much fewer organisms. Such solutions, if the glucose content was not too high, showed, after about 2 days, a practically complete absence of reducing power by the method used. The residual reducing compounds were not present in the organisms themselves, for centrifuged and uncentrifuged specimens gave values which appeared identical. Specimens filtered through washed and unwashed filter paper² also gave identical values. Blood and plasma obtained with precautions to insure sterility gave results similar to those obtained on the filtrates.

In about 50 experiments a similar technique based on the copper reduction method of Benedict³ was used, generally on specimens which were simultaneously analyzed as described above. This method is not well suited for the determination because of the high color given by the blank. In spite of the difficulty in making the readings there was no doubt that it showed much less reducing substance present than did the technique of Folin and Wu, and in most determinations the color given by the unknown was indistinguishable from that of the blank. There was no perceptible difference between the color given by plasma and whole blood even in specimens where the difference by the Folin and Wu method was striking. Furthermore, when a known amount of glucose was added, the added glucose and no more was recovered. As an additional check a known amount of glucose was added to a pure glucose solution in which colon bacillus had been growing for some time, and in which the reducing power was greatly decreased. Here the total glucose

recovered was equivalent to the sum of the added glucose plus the residual reduction determined by the Folin-Wu technique.

The authors feel that these experiments show the presence in whole blood of reducing compounds which are not affected by colon bacilli. These compounds are present in much lower concentration in plasma, and are not included, or included only to a very slight extent, in the determination by Benedict's copper method.

¹ Folin, O., and Wu, H., *J. Biol. Chem.*, 1919, **xxxviii**, 81.

² Some of the control experiments were suggested in a private communication by Dr. Stanley R. Benedict.

³ Benedict, S. R., *J. Biol. Chem.*, 1925, **lxiv**, 207.

3872

Lipoid Nephrosis in Adrenalectomized Rats and Guinea Pigs.

F. D. GUNN, C. F. CORI AND F. A. HARTMAN.

From the Laboratories of the Buffalo General Hospital, the State Institute for the Study of Malignant Diseases and the Department of Physiology of the University of Buffalo.

A paper recently published¹ describes lipoid nephrosis in completely adrenalectomized cats. We wished to know whether a similar condition developed in guinea pigs which, judging from the relative size of the adrenals to body weight, make greater use of the adrenals than any other animal, and in rats, which are known to require the adrenals less than most other mammals.

The guinea pig adrenals were destroyed in 2 stages 1 week apart, by electric cautery, care being taken to injure no other organs. The rat adrenals were removed through a single slit in the skin in the mid-line of the back by the lumbar path at one operation.

It was shown by autopsy that the guinea pig adrenals had been completely destroyed. The average survival, exclusive of 1 animal which died from overheating and 2 which died from shock, was 8.8 days. Although 7 animals are an insufficient basis to draw up a conclusive average for the survival period, the results would seem to indicate that there is little difference from cats.

The rats shown in the table belong to a series of 60 operated animals. Since only those animals which were in poor condition were turned over for histological examination, the periods of survival shown in the table are not representative of the whole series. The