fective material derived from vegetative foci within the *ductus* and the adjacent portions of the pulmonary artery, reaches the peripheral circulation by passing through the pulmonary circuit or by entering the aorta through the *ductus,* or both.

The observations described herein demonstrate directly, that: (1) The lungs play an important rôle in removing infective material from the circulating blood of humans; and (2) in cases of subacute bacterial endarteritis superimposed on patent *ductus arteriosus,* infective material enters the peripheral circulation, at least in part, through the pulmonary circuit.

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Glucoside Type of Cerebroside in the Spleen in Gaucher's Disease.

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It has been generally assumed that the cerebroside found in the enlarged spleen characteristic of Gaucher's disease is the usual galactoside type of kerasin. The principal published evidence for this concept is the melting point of the phenylosazone prepared from the cerebroside hydrolysate.[1] However, Halliday, *et al.*,[2] proved by fermentation and by the properties of the phenylosazone that the kerasin-like cerebroside in one case of Gaucher's disease contained *d*-glucose rather than *d*-galactose. The spleen used by these investigators had been preserved in formalin for several weeks.

We wish to report the isolation of glucose-containing cerebroside from a fresh spleen which was removed surgically from a four-year-old girl with Gaucher's disease. The clinical diagnosis was confirmed by pathological examination of the spleen which weighed 530 g.

The cerebroside was isolated by the method of Kaye[3] (maceration of the spleen with plaster of Paris, extraction of the powdered mass with three parts of boiling 95% ethyl alcohol, filtration, and crystallization of the cerebroside by cooling the filtrate below 0°C). The

1 Lieb, H., *Z. physiol. Chem.*, 1924, **140**, 305; Lieb, H., and Mladenovic, M., *Z. physiol. Chem.*, 1929, **181**, 208.

2 Halliday, N., Deuel, H. J., Jr., Tragerman, L., and Ward, W. E., *J. Biol. Chem.*, 1940, **132**, 171.

3 Kaye, I. A., *J. Lab. Clin. Med.*, 1940, **25**, 1117.

yield of crude cerebroside from a single extraction was equivalent to 1.17% of the moist spleen. The cerebroside was purified by extraction with ether for four hours, and by repeated recrystallization from hot methyl alcohol. The purified cerebroside was white and had a melting point of 175°C.

The method of Rosenheim[4] was used for hydrolysis of the cerebroside. A solution of 1 g in 50 ml of hot methyl alcohol containing 5 ml of concentrated sulfuric acid was refluxed 6 hours on a water bath. After cooling below 0° C for fifteen hours, the methyl ester of lignoceric acid was removed by filtration. The filtrate was diluted with one-half volume of water containing sufficient sulfuric acid to produce a 10% solution, and it was then hydrolyzed 10 hours on a boiling water bath. After neutralization with silicate-free potassium hydroxide to bromthymol blue, a tarry mass of sphingosine sulfate separated and was removed by filtration. The hydrolysate was diluted to a volume of 100 ml, and aliquots were used for identification of the carbohydrates. All procedures and analyses were conducted in duplicate.

The reducing equivalents of the carbohydrate were determined by the Folin-Wu[5] and Sumner[6] methods, a 6 to 100 dilution of the neutralized hydrolysate being used for the former, and a 1 to 2 dilution for the latter. The respective equivalents were found to be 1.50 and 1.53 mg of glucose per ml of hydrolysate. The Sumner/Folin-Wu ratio (0.98) was within experimental error of the characteristic ratio for *d*-glucose (1.00), and it was far removed from the ratio for *d*-galactose (1.24).[7, 8] On the basis of an estimated 70% recovery in the hydrolysate,[7] the cerebroside contained 21.9% of *d*-glucose. The reducing sugar in the hydrolysate was completely removed by short-period fermentation with fresh Fleischmann's yeast which had been washed 5 times with distilled water. The optical rotation of the neutralized hydrolysate was determined in a Schmidt and Haensch polariscope with an electric sodium lamp. The calculated specific rotation was +47.6°, as compared with +53.4° for a glucose solution subjected to similar hydrolytic treatment. The discrepancy between the two values was equivalent to a difference in observed rotations of only 0.04°. The presence of *d*-galactose was excluded by these results.

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[4] Rosenheim, O., *Biochem. J.*, 1913, **7**, 604.

[5] Folin, O., *J. Biol. Chem.*, 1920, **41**, 367.

[6] Sumner, J. B., *J. Biol. Chem.*, 1925, **65**, 383.

[7] Everett, M. R., Edwards, B., and Sheppard, F., *J. Biol. Chem.*, 1934, **104**, 11.

[8] Everett, M. R., and Sheppard, F., *J. Am. Chem. Soc.*, 1938, **60**, 1792.

Conclusions. The isolated cerebroside was not the customary kerasin; it contained *d*-glucose in place of the usual *d*-galactose component, as proven by fermentation, optical rotation and reducing equivalents. Halliday, *et al.*, suggested that the cerebroside isolated by them might represent an anomaly of carbohydrate metabolism. Our results, and those recently reported by Klenk and Schumann,[9] indicate that synthesis of a glucoside type of splenic kerasin is a frequent occurrence in Gaucher's disease.

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Electrical Properties of Tissues in Shock Therapy.

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A lack of knowledge of the exact treatment current has hindered the standardization of electrical shock therapy. This has been especially true because the treatment current does not appear to follow "Ohm's law"—that is, the current is not equal to the treatment voltage divided by the measured (d-c) resistance between the electrodes, but usually is considerably higher. Also, the resistance varies in what has appeared to be an "unpredictable" manner. For these reasons, an *a priori* selection of the treatment current has appeared to be impossible.

It is, of course, the passage of the electric current which is responsible for the convulsive shocks, rather than the applied voltage of itself, so that dosage standardization must be on the basis of the former. The voltage required to obtain a given current will depend upon many factors, such as the thickness of the skull, area of electrodes, condition of the skin, etc. Obviously a rational prescription of dosage requires some method of taking these factors into account. This was recognized even in the original work of Cerletti and Bini (1938), who employed a d-c resistance measurement as mentioned above. However, this bears no relationship to the effective resistance during treatment.

A study of the electrical properties of the tissues involved offers an explanation of the apparently anomalous behavior of the resistance. This has made possible the accurate preselection of the treatment current used in shock therapy.

9 Klenk, E., and Schumann, E., *Z. physiol. Chem.*, 1940, **267**, 128.