

cose makes it apparent that there is adequate formation of acetyl Co-A under these circumstances; thus a deficiency of acetyl Co-A cannot be used to explain the depressed fatty acid synthesis.

Thus, the present evidence suggests that fatty acid synthesis is dependent upon normal glucose metabolism for the production of three substances: (a) acetyl Co-A, the structural unit from which fatty acid synthesis proceeds; (b) reduced diphosphopyridine nucleotide (DPNH) which is required for most of the reductive steps in the synthesis of fatty acids; and (c) TPNH which is necessary for the reduction of crotonyl Co-A to butyryl Co-A. In diabetes, the abundant production of acetoacetic and  $\beta$ -hydroxybutyric acids indicates no deficiency of acetyl Co-A formation or the production of DPNH. The defect in fatty acid synthesis in the diabetic can best be explained in the following manner. Because of the insulin deficiency, glucose available for metabolism within the cell is greatly reduced and the fraction of glucose utilized via the PGO pathway is particularly depressed. Under these circumstances fatty acid synthesis from acetyl Co-A is limited by the availability of TPNH formed in the PGO pathway. It would appear that the synthesis of fatty acid is regulated by glucose utilization via the PGO pathway.

## REFERENCES

<sup>1</sup> Drury, D. R.: The role of insulin in carbohydrate metabolism. *Am. J. Physiol.* 131:536, 1940-41.

<sup>2</sup> Stetten, D., Jr., and Boxer, G. E.: Studies in carbohydrate metabolism. III. Metabolic defects in alloxan diabetes. *J. Biol. Chem.* 156:271, 1944.

<sup>3</sup> Lynen, F.: Acetyl coenzyme-A and fatty acid cycle. Harvey Lectures, Series XLVIII: 210, 1952-53.

<sup>4</sup> Shaw, W. N., Dituri, F., and Gurin, S.: Lipogenesis in particle-free extracts of rat liver. II. Experimental diabetes. *J. Biol. Chem.* 226:417, 1957.

<sup>5</sup> Langdon, R. G.: The biosynthesis of fatty acids in rat liver. *J. Biol. Chem.* 226:615, 1957.

<sup>6</sup> Felts, J. M., Doell, R. G., and Chaikoff, I. L.: The effect of insulin on the pathway of conversion of glucose to fatty acids in the liver. *J. Biol. Chem.* 219:473, 1956.

<sup>7</sup> Siperstein, M. D.: Glycolytic pathways. Their relation to the synthesis of cholesterol and fatty acids. *Diabetes* 7:181, 1958.

<sup>8</sup> Milstein, S. W.: Oxidation of specifically labeled glucose by rat adipose tissue. *Proc. Soc. Exp. Biol. and Med.* 92:632, 1956.

<sup>9</sup> Winegrad, A. I., and Renold, A. E.: Studies on rat adipose tissue in vitro. I. Effects of insulin on the metabolism of glucose, pyruvate and acetate. *J. Biol. Chem.* 223:267, 1958.

<sup>10</sup> Winegrad, A. I., and Renold, A. E.: Studies on rat adipose tissue in vitro. II. Effects of insulin on specifically labeled glucose. *J. Biol. Chem.* 223:273, 1958.

<sup>11</sup> Winegrad, A. I., Shaw, W. N., and Renold, A. E.: Depression by growth hormone of the phosphogluconate oxidative pathway in adipose tissue. *J. Clin. Invest.* 37:73, 1958.

WALTER N. SHAW, PH.D.  
ALBERT I. WINEGRAD, M.D.  
Philadelphia

## BOOK REVIEWS

*THE CLINICAL APPLICATION OF HORMONE ASSAY.* By John A. Loraine, M.B., Ph.D., M.R.C.P. (Ed.). \$7.00, pp. 368, *The Williams & Wilkins Co., Baltimore, 1958.*

This is an exceptionally valuable book. It is indeed a major undertaking to review and winnow the extensive literature pertaining to hormone assays. However, the author brings to the subject unique qualifications—a broad personal experience in hormone research, sound critical judgment and a most pleasing clarity of presentation.

In the initial chapter the general principles of hormone assay are discussed—criteria of reliability, practicability, factors entering into bio-assays and calculation of errors in bio-assays. Subsequent chapters are devoted to the individual hormones. In each chapter the several bio-assay and/or chemical assay procedures that have been published are outlined and discussed critically. In addition, the author reviews the results of assays made under normal and abnormal circumstances, a feature of particular interest to the clinician. The greatest amount of space is devoted to the gonadotropins, estrogens and progesterone, reflecting, no doubt, the author's particular interests. The discussions of the other hormones are less extensive; however, with the single exception of the chapter on insulin, which is brief (only seven pages) and less complete than one might

wish, these other chapters are highly satisfactory.

In summary, this book is a most welcome addition to the book shelf, not only of the investigator interested in hormone research, but of the clinician as well.

*THE NURSE AND THE DIABETIC.* By Joan B. Walker, M.D., M.R.C.S., L.R.C.P. \$1.47 net (by post \$1.57), pp. 128, *fourteen photographs and a number of line drawings, Iliffe & Sons Ltd., London, 1958.*

This is a very well organized discussion of the management of the diabetic, with particular emphasis on the role played by the nurse. It seems quite appropriate that the discussion includes an explanation of the nature of diabetes, a description of the more routine laboratory tests, and a review of the diets and their importance. As nurses are now getting better technical training and are becoming responsible for simple laboratory tests, it is indeed fitting that this should have been discussed.

The management of the outpatient diabetic clinic is excellent and brings out the importance of having the patients seen by the staffs of other departments, such as the Eye Department, the Dental Department and the Chiroprapist. A chapter also covers the diabetic emergencies that bring the patient into the hospital, and a discussion of the diabetic in the home. There is ample information on directions for taking insulin and a short discussion of the new sulfonylurea hypoglycemic drugs. This book can be recommended to nurses and to diabetic patients.