ABSTRACTS

Bailey, C. Cabell (New Eng. Deaconess Hosp., Boston, Mass.): DIABETES IN ADOLESCENCE. Med. Clin. N. Amer. 49:451-66, March 1965.

The etiology, treatment and prognosis of juvenile diabetes is reviewed. The treatment of early juvenile diabetes with sulfonylureas or biguanides is not encouraged because of the usual inevitability of ultimate total diabetes. An optimistic approach to management with reassurance on the part of the physician is recommended. The exchange diet is advocated. A degree of diabetes control avoiding acetonuria and permitting glycosuria of less than 5 per cent of carbohydrate intake per day is set forth. The opinion is expressed that poor control of diabetes is related causally to the incidence and severity of vascular degenerative complications. T.G.S.

Bassenge, E.; Wendt, V. E.; Schollmeyer, P.; Blümchen, G.; Gudbjarnason, S.; and Bing, R. J. (Dept. of Med., Wayne State Univ. Sch. of Med.; and Harper Hosp., Detroit, Mich.): EFFECT OF KETONE BODIES ON CARDIAC METABOLISM. Amer. J. Physiol. 208:162-68, January 1965.

The effect of acetoacetate infusion on myocardial metabolism was studied in thirteen dogs at varying concentrations of acetoacetate. Acetoacetate was extracted by the myocardium at arterial levels of from 1 to 54 mg./100 ml. At arterial levels of above 60 mg./100 ml., extraction of acetoacetate by the heart was minute. Considerable amounts of the infused acetoacetate were reduced to beta-hydroxy-butyrate. Acetoacetate inhibited the utilization of free fatty acids by the heart, resulting in a rise in the respiratory quotient of the heart. The ketone became the preferred fuel of the myocardium at arterial acetoacetate levels between 34 and 54 mg./100 ml. Arterial glucose levels fell gradually during the experiment, leading to severe hypoglycemia. Coronary blood flow, heart rate, left ventricular pressure, myocardial contractility, and EKG were not affected significantly by arterial acetoacetate levels ranging from 1 to 80 mg. per 100 ml. M.G.B.

Bishop, J. S.; Steele, R.; Altszuler, N.; Dunn, A.; Bjerknes, C.; and de Bodo, R. C. (Dept. of Pharmacol., New York Univ. Sch. of Med., New York; and Biol. Dept., Brookhaven National Lab., Upton, N.Y.): EFFECTS OF INSULIN ON LIVER GLYCOGEN SYNTHESIS AND BREAKDOWN IN THE DOG. Amer. J. Physiol. 208:307-16, February 1965.

Glucose-C-14 was given intravenously in trace amount, as an initial dose followed by continuous infusion, to measure glucose-C-12 release by the liver and total glucose uptake from plasma by the tissues. The glycogen content of liver and the C-14 incorporated into the glycogen and the nonglycogen constituents of liver were measured. Glucose 6-C-14 was used to show that direct uptake and conversion to liver glycogen (without passage through three carbon intermediates) of tagged blood glucose molecules was the source of almost all the C-14 of glycogen. Insulin infusion at 0.1-0.2 U./kg. per hour, intravenously, along with glucose to limit hypoglycemia, stopped glycogen loss, decreased glucose-C-12 release, increased glucose uptake from the plasma by the tissues and brought about the incorporation of plasma glucose-C-14 units into liver glycogen. Incorporation of C-14 into the nonglycogen constituents of the liver was increased much less. Glucose infusion, presumed to stimulate endogenous insulin secretion, produced similar effects. In earlier periods of insulin infusion the outstanding hepatic effects were decreases in glycogen loss and glucose-C-12 release. In later periods the outstanding further effect was a great increase in the use of plasma glucose-C-14 for liver glycogen synthesis. M.G.B.

Brandt, Lars; Norden, Ake; Schersten, Bengt; and Tryding, Nils (Depts. of Med. and Clin. Chem., Univ. Hosp., Lund, Sweden): A DIABETES DETECTION CAMPAIGN IN SOUTHERN SWEDEN: RESULTS OF 69,000 EXAMINATIONS. Acta Med. Scand. 176:555-61, November 1964.

In 1962, one of the two southernmost counties of Sweden was studied for the prevalence of diabetes. Sixty-eight-thousand, nine-hundred and seventy-two persons (82.4 per cent of the population over fifteen years of age) were studied. In 661 instances, or 0.96 per cent, reports were obtained of already known cases of diabetes. A positive postprandial Clinistix test was recorded in 620 cases (0.90 per cent). Glucose tolerance tests were performed on 595 of these persons. Diabetes was found in 242 cases, fourteen of whom had diabetic retinopathy, and two of whom had gangrene of the toe. In this group there was a family incidence of diabetes of 23.5 per cent. There were 142 instances of questionable diabetes (0.21 per cent) with a family history of diabetes in 22.5 per cent. B.F.K.

Chetty, M. P.; and Watson, K. C. (Dept. of Path., and Subdept. of Microbiology, Univ. of Natal, Durban, R.S.A.): ANTIBODY-LIKE ACTIVITY IN DIABETIC AND NORMAL SERUM, MEASURED BY COMPLEMENT CONSUMPTION. Lancet 1:67-69, Jan. 9, 1965.

Insulin-binding and insulin-neutralizing antibodies are commonly found in the sera of diabetics who have been treated with exogenous insulin. Little effort has been made to study sera from diabetics who have never been treated with insulin. The authors evaluated this factor using a complement fixation test. Their preliminary results showed that the sensitivity of the method could be enhanced by extending the incubation time to ninety-six hours. When this was done, 58 per cent of 167 sera from diabetics who had never received insulin gave a positive reaction. In a series of 283 sera from control subjects, 28 per cent were positive. The findings were interpreted as indicative that insulin binding to beta globulin in vitro can result in the fixation of complement. However, this does not imply that an autoantibody to endogenous insulin is involved. A more likely explanation could be that the complement fixation is due to a reaction between insulin and a carrier protein. Plans are being made to follow the clinical course of the nondiabetics who had complement fixing sera. T.G.S.

Cooperstein, S. J.; and Lazarow, Arnold (Dept. of Anat., Western Reserve Univ. Sch. of Med., Cleveland, Ohio; Dept. of Anat., Univ. of Minnesota Sch. of Med., Minneapolis, Minn.; and Marine Biol. Lab., Woods Hole, Mass.): DISTRIBUTION OF ALLOXAN-C-14 IN ISLET AND OTHER TISSUES OF THE

TOADFISH (OPSANUS TAU). Amer. J. Physiol. 207:423-30, August 1964.

The islet tissue of the toadfish is segregated into a discrete mass, separated from the acinar tissue. Alloxan is diabetogenic in this species. The concentration of C-14 in islet and other tissues was measured at varying time intervals following the injection of trace amounts of alloxan-2-C-14. The islet C-14 content never exceeded 50 per cent of that of blood and was no greater than that found in many other tissues. Thus the selectivity of alloxan is not due to selective concentration by islet tissue. The distribution of C-14 from alloxan was very similar to that of D-mannitol-1-H^3 injected simultaneously. This suggests that tracer doses of alloxan are restricted to the extracellular compartment and that the B-cell membrane may be a primary site of alloxan action. M.G.B.

Cubberley, Peter T.; Polster, Sheldon A.; and Schulman, Charles L. (Dept. of Med., Cleveland Veterans Administration Hosp.; Dept. of Med., Univ. Hosp. of Cleveland, Cleveland, Ohio): LACTIC ACIDOSIS AND DEATH AFTER THE TREATMENT OF OBESITY BY FASTING. New Eng. J. Med. 272:628-30, March 25, 1965.

The authors describe a forty-four-year-old Negro female weighing 400 pounds who developed fatal lactic acidosis during a three-month period of intermittent fasting. This patient was in the third week of a fasting period when she developed the severe lactic acidosis, i.e., excess lactate level of 16.27 mEq./L., ketonemia, hypotension and death. B.R.B.

Davis, Richard A.; Brooks, Frank P.; and Robert, Cavett McN., Jr. (Depts. of Neurosurgery and Physiol., Schs. of Med., Univ. of Pennsylvania, Philadelphia, Pa.): GASTRIC SECRETORY RESPONSE TO GRADED INSULIN HYPOGLYCEMIA. Amer. J. Physiol. 208:6-8, January 1965.

Variable doses of insulin (0.01-1.5 U./kg.) were given intravenously to dogs outfitted with a Thomas fistula. During the first two hours after insulin gastric secretion increased if the blood sugar concentration fell to 40 mg. per 100 ml. or less, but there was no correlation of acid output to the rate of fall of the blood sugar. In most experiments, increase in flow of gastric contents occurred simultaneously to or followed the lowest point reached by the blood sugar. M.G.B.

Fearnlfy, G. R.; Chakrabarti, R.; and Hocking, Elizabeth D. (Gloucestershire Royal Hosp., Gloucester, England): PHENFORMIN IN RHEUMATOID ARTHRITIS. Lancet 1:9-13, Jan. 2, 1965.

Because of the finding that fibrinolytic activity tends to be less than normal in patients with rheumatoid arthritis, the authors advanced the hypothesis that inadequate fibrinolysis might be a factor in maintaining inflammation. They discovered that the oral hypoglycemic drug phenformin could induce fibrinolytic activity and designed a therapeutic trial to assess its effects in patients with rheumatoid arthritis. Five males and eleven females, aged thirteen to seventy-five years, with mild to moderately severe rheumatoid arthritis, were given phenformin in daily doses of 50-150 mg. for fourteen to forty-five days and serial values of lysis time, fibrinogen levels, erythrocyte sedimentation rates and grip strength were compared with those obtained during control periods or placebo therapy. Phenformin therapy resulted in decreases in mean lysis times, fibrinogen levels and ESR and increases in grip strength in all subjects. Clinical response of the arthritis was judged to be good in ten, fair in two and poor in four. The results are interpreted as evidence that impaired fibrinolysis is causally related to inflammation, and that this activity can be improved by phenformin. T.G.S.

Froberg, Sven; Liljedahl, Sten-Otto; and Oro, Lars (King Gustaf V'th Res. Inst.; and Depts. Intern. Med. and Surg., Karolinska Sjukhuset, Stockholm, Sweden): FREE FATTY ACIDS OF PLASMA DURING INSULIN-INDUCED HYPOGLYCEMIA IN DOG: THE EFFECT OF ADRENALECTOMY AND TREATMENT WITH RESERPINE, AZAMETHONIUM AND NICOTINIC ACID. Acta Med. Scand. 176:685-92, December 1964.

Changes in the concentration of free fatty acids of plasma during insulin-induced hypoglycemia were studied in anesthetized dogs. After an initial decrease, the free fatty acid level increased significantly in intact as well as in adrenalectomized dogs. In dogs treated with nicotinic acid or with the sympathetic blocking agents, reserpine and azamethonium, no increase in the free fatty acid level was observed. This indicates an increase in the free fatty acid level can occur during hypoglycemia without a release of catecholamines from the adrenal glands. The role of the extra-adrenal part of the sympathetic nervous system for the hypoglycemia-induced mobilization of free fatty acid is discussed. B.F.K.

Frohlich, Edward D. (Med. Service, Veterans Administration Research Hosp., and Dept. of Med., Northwestern University Medical Sch., Chicago, Ill.): VASCULAR EFFECTS OF THE KREBS INTERMEDIATE METABOLITES. Amer. J. Physiol. 208: 149-53, January 1965.

The vascular effects of seven intermediary products of oxidative metabolism (acetate, citrate, fumarate, malate, α-ketoglutarate, oxalacetate, and succinate) were studied on the constantly perfused kidney or forelimb in thirty-two dogs. Significant vasodilation was obtained at submaximal dosages, usually 2.47 μmole/min. in both vascular beds for all agents without changing systemic pressure. Saline had no effect. Active dilation was localized to small vessel segment (25 per cent fall). Arterial and venous segment resistances were unchanged. It is concluded that the Krebs intermediates should be included among those agents termed "vasodilating metabolites," and that these compounds could be exceedingly important in the local regulation of blood flow. M.G.B.

Grodsky, Gerald M.; Karam, John H.; Pavlatos, Fotios Ch.; and Forsham, Peter H. (Metabolic Research Unit, and Depts. of Med. and Biochemistry, Univ. of Calif. School of Med., San Francisco, Calif.): SERUM-INSULIN RESPONSE TO GLUCOSE IN PREDIABETIC SUBJECTS. Lancet 1:290-91, Feb. 6, 1965.

Some maturity-onset diabetics show sustained elevated serum-insulin levels (radio-immune technic) after glucose loading. A similar response is seen in nondiabetic obese subjects and in acromegaly. However, nonobese maturity-onset diabetics often do not display this response. Since the measurement of insulin after glucose loading has been utilized as a method of investigating the prediabetic state, the authors compared a group of nonobese control subjects with a group of nonobese "prediabetics." The test group was comprised of nine subjects who had two diabetic parents, eight who had one diabetic parent and a diabetic sibling, seven who had one diabetic parent and four who had diabetes in remission. All were lean and had

normal glucose tolerance at the time of the evaluation. When compared to the controls, twenty of the twenty-four prediabetics had a normal response to glucose loading. These findings suggest that attempts to detect an excessive serum-insulin response at thirty to 120 minutes after glucose loading may be of limited value as a sign of prediabetes. T.G.S.

Gutman, Alisa; and Shafrir, Eleazar (Lab. of Clin. Biochemistry, Dept. of Biochemistry, Hebrew Univ.—Hadassah Med. Sch. and Hadassah Univ. Hosp., Jerusalem, Israel): METABOLIC INFLUENCES ON ENZYMES OF GLYCOGEN SYNTHESIS AND BREAKDOWN IN ADIPOSE TISSUE. Amer. J. Physiol. 207:1215-20, December 1964.

Rat adipose tissue from different body sites was shown to contain uridine diphosphoglucose (UDPG)-transglucosylase activity, which on the basis of protein content was comparable to, or higher than, that reported for muscle or liver. In epididymal adipose tissue, the activity of UDPG-glycogen transglucosylase and phosphorylase, as well as the content of glycogen per wet weight, decreased with increasing age of the animals in parallel with the decrease of tissue protein content. Both enzyme activities (expressed per milligram tissue protein) decreased by 25-50 per cent of the control values following prolonged fasting. Refeeding restored the original activity within twenty-four hours. The ratio of glucose 6-phosphate independent activity of UDPG-glycogen transglucosylase to total activity was not affected by fasting and refeeding or by the administration of glucose with insulin. In adrenalectomized rats, with high adipose tissue glycogen, no change in UDPG-glycogen transglucosylase was found, whereas the levels of phosphorylase were elevated. Epinephrine in vivo and vitro did not affect the activity of UDPG-glycogen transglucosylase of adipose tissue. M.G.B.

Hales, C. N.; Walker, Joan B.; Garland, P. B.; and Randle, P. J. (Leicester Royal Infirmary, Univ. of Bristol; and Univ. of Cambridge, Cambridge, England): FASTING PLASMA CONCENTRATIONS OF INSULIN, NON-ESTERIFIED FATTY ACIDS, GLYCEROL, AND GLUCOSE IN THE EARLY DETECTION OF DIABETES MELLITUS. Lancet 1:65-67, Jan. 9, 1965.

Previous studies by the authors indicate that a defect in fat metabolism exists early in the course of diabetes. The abnormality is characterized by a failure of circulating insulin to lower free fatty acids (FFA) and provokes the hypothesis that early diabetes might be detected by finding elevated FFA and plasma insulin levels in subjects with normal blood sugar concentrations. The concept was tested during the course of a diabetes detection survey using measurements of blood glucose, FFA, plasma insulin and glycerol. Eleven nondiabetic glycosuric subjects, thirty-two people with normal glucose tolerance and thirty-four patients with varying grades of diabetes were studied. The mean insulin levels were about twice as high in the diabetics and in patients with mildly abnormal glucose tolerance as in the nondiabetics. However, the FFA and glycerol levels varied widely in both groups, and separation of early diabetics from normals could not be achieved. Accordingly, it was concluded that under field conditions, measurement of FFA and glycerol are probably of little value in diabetes detection. Plasma insulin levels could be of value if a rapid and automated technic is employed. T.G.S.

Hansen, Ruth Osterby (Second Univ. Clinic of Int. Med., Aarhus Kommunehospital; and the Inst. of Gen. Path. and Bacteriology, Univ. of Aarhus, Aarhus, Denmark): BACTERIURIA IN DIABETIC AND NON-DIABETIC OUTPATIENTS. Acta Med. Scand. 176:721-30, December 1964.

Bacterial counts were performed on mid-stream-voided urine from 148 diabetic outpatients, eighty-one women and sixty-seven men, and from a similar number of control patients. True bacteriuria was defined as 10^5 or more bacteria per milliliter of urine, when the bacterial count was not attributable to small coryneiform rods or a mixed flora of gram-positive cocci, and gram-positive rods. The frequency of true bacteriuria was found to be significantly increased in diabetics as compared with patients from the control group, and for women was 18.5 per cent, and 3.7 per cent respectively, and for men 7.5 per cent and 3.0 per cent, respectively. No correlation was found between the known duration of diabetes and the frequency of bacteriuria in women, whereas all five men with bacteriuria had a duration of diabetes exceeding fifteen years. There was no relation between late diabetic vascular disorders and bacteriuria in the material presented. B.F.K.

Jones, Evelyn M.; Montoye, Henry J.; Johnson, Perry B.; Martin, Sister M. John Martin; Van Huss, Wayne D.; and Cederquist, Dena (Depts. of Foods and Nutrition and Dept. of Health, Physical Education, and Recreation, Michigan State Univ., East Lansing, Mich.): EFFECTS OF EXERCISE AND FOOD RESTRICTION ON SERUM CHOLESTEROL AND LIVER LIPIDS. Amer. J. Physiol. 207:460-66, August 1964.

The effect of fifteen weeks of regular, vigorous exercise (swimming) on body composition and on the hepatic and serum cholesterol was studied in rats fed ad libitum. Caloric restriction without exercise was imposed on another group of rats, while a third group was fed ad libitum and was not exercised. The body weights of the sedentary rats on the restricted diet remained similar to that of the exercised group, while the sedentary rats fed ad libitum gained weight more rapidly than the other two groups. However, the body composition on a percentage basis was almost identical in the two sedentary groups and different from that of the exercised rats. Exercise was effective in preventing most of the increase in body fatness and serum cholesterol concentration associated with an increase in age. Neither total nor free cholesterol concentration in the liver was affected by exercise, but the concentration of total hepatic lipids was reduced. Body fatness, serum cholesterol, and concentration of total hepatic lipids were all positively correlated with each other and inversely related to weight of the adrenal glands in the animals. M.G.B.

Krahl, M. E. (Dept. of Physiology, Univ. of Chicago, Chicago, Ill.): SPECIFICITY OF INSULIN OR OXYTOCIN STIMULATION OF PROTEIN SYNTHESIS IN ADIPOSE TISSUE. Amer. J. Physiol. 207:1169-72, November 1964.

Insulin stimulates glucose uptake, fat synthesis, and incorporation of amino acids into protein of rat adipose tissue. Other agents having insulin-like effects on glucose metabolism have now been tested for their ability to promote protein synthesis in this in vitro system. Synthetic oxytocin (Sandoz), 0.1-10 U./ml., stimulated glucose uptake, acetate incorporation into lipid, and histidine-C-14 incorporation into protein when glucose was present; unlike insulin, oxytocin did not

enhance protein synthesis when pyruvate replaced glucose in the medium. RNA (1 mg./ml.), nicotinic acid (0.001 M), and protamine sulfate (1 mg./ml.) each stimulated glucose uptake and acetate incorporation into lipid, but did not enhance histidine-C-14 incorporation into protein. It is concluded that in adipose tissue insulin has a specific effect on protein synthesis which cannot be mimicked by other agents which stimulate glucose uptake or lipid synthesis. M.G.B.

Kreisberg, Robert A., and Williamson, John R. (Baker Clinic Res. Lab., Dept. of Med., Harvard Med. Sch., Boston, Mass.): METABOLIC EFFECTS OF OUABIN IN THE PERFUSED RAT HEART. Amer. J. Physiol. 207:347-51, August 1964.

Ouabain increased the uptake and oxidation of glucose-U-C-14 by perfused guinea pig and rat hearts by 50 per cent. Cardiac glycogen content remained constant and no change in glycogen specific activity was observed. The metabolic changes produced by ouabain were dependent on the calcium concentration of the perfusate. Reduction of the calcium content of the perfusate by 50 per cent abolished the increase in C-14-O_2 production by ouabain. The C-14-O_2 production of hearts perfused with buffer containing twice the physiological calcium concentration was similar to that of hearts perfused with buffer containing the normal calcium concentration and ouabain. The concentration of glycolytic intermediate was increased in hearts following ouabain perfusion, while AMP, ADP and ATP concentration did not change and no intracellular free glucose could be detected.

While ouabain stimulates glucose transport and glycolysis in hearts, the former step remains rate limiting. It is suggested that the effects of glycosides on the glucose metabolism of cardiac muscle are dependent on changes in calcium transport or concentration at the site of the contractile elements. M.G.B.

Lepkovsky, S.; Len, R.; Koike, T.; and Bouthilet, R. (Dept. of Poultry Husbandry, Univ. of Calif., Berkeley, Calif.): EFFECTS OF PROTAMINE ZINC INSULIN ON CHICKENS. Amer. J. Physiol. 208:589-92, March 1965.

The injection of Protamine Zinc Insulin into laying hens caused hypoglycemia as it does in other animals. Blood sugars decreased from 200 mg. per 100 ml. (normal) to as low as 87 mg. per 100 ml. However, no convulsions were observed. While insulin treatment increased feed intake and body weight in other animals, it did the opposite in chickens: it decreased feed intake, body weight, and egg production. Damage to the central nervous system in some of the chickens was indicated by their behavior. It was tentatively concluded that the aphagia in chickens following injection with Protamine Zinc Insulin was due to the apparent damage to the nervous system. M G.B.

Levine, Robert A. (Dept. of Internal Med., Yale Univ. Sch. of Med., New Haven, Conn.): EFFECT OF GLYCOGENOLYTIC AGENTS ON PHOSPHORYLASE ACTIVITY OF PERFUSED RAT LIVER. Amer. J. Physiol. 208:317-23, February 1965.

Isolated rat livers were perfused with a mixture of oxygenated heparinized rat blood and Ringer's solution, with or without added glycogenolytic agents. Endoportal administration of 10^{-6} M glucagon, 10^{-5} M epinephrine, and 10^{-3} M cyclic 3,′5′-adenosine monophosphate (3′5′-AMP) induced glycogenolysis, hyperglycemia, and increase in liver phosphorylase activity, usually within one hour after the onset of infusion. ATP, 10^{-3} M, also caused glycogenolysis, but the onset was slower than with the cyclic nucleotide, and phosphorylase activation was inconstant. Hyperglycemic effects of these two adenine nucleotides were also demonstrated in intact rats. Anoxia and hypoxia caused substantial glycogenolysis but did not stimulate phosphorylase activity, implying that some other mechanism accounts for the glycogen breakdown induced by reduced oxygen tension. Glycogenolysis and phosphorylase activation were not produced by administration of 10^{-2} M 5′-AMP, 10^{-4} M isoproterenol, adrenocorticotrophic hormone, or insulin. M.G.B.

Merimee, Thomas J.; Lockwood, Dean H.; and Prout, Thaddeus E. (Dept. of Med., The Johns Hopkins Univ. Sch. of Med., Baltimore, Md.): THE RELATIONSHIP OF INSULIN I-131 TO SERUM PROTEIN FRACTIONS. Bull. Hopkins Hosp. 116:191-203, March 1965.

Purified insulin I-131 of low specific activity (average 9.3 mc./mg.) was used to assess binding capacities of human serum protein fractions. The ratio of bound to free insulin was studied by Sephadex gel filtration, and it was found that Cohn fractions IV and VI, rich in alpha globulins, had greater affinities for insulin than other fractions. The possibility that an alpha globulin may be a physiological binding site for insulin is considered. O.V.S.

Miller, H. I.; Issekutz, B., Jr.; Paul, P.; and Rodahl, K. (Div. of Research, Lankenau Hospital, Philadelphia, Pa.): EFFECT OF LACTIC ACID ON PLASMA FREE FATTY ACIDS IN PANCREATECTOMIZED DOGS. Amer. J. Physiol. 207:1226-30, December 1964.

Sodium lactate infusions into unanesthetized pancreatectomized dogs markedly decreased the plasma free fatty acid (FFA) level. Infusions of palmitate-1-C-14 at constant rates showed that the rate of release of FFA was considerably reduced by the lactate. There was an inverse correlation between the logarithm of the plasma FFA concentrations and the logarithm of the blood lactate levels. Glucose infusion alone had no significant effect on the plasma FFA of the pancreatectomized dog. When both lactate and glucose were infused into the pancreatectomized dog, the plasma FFA was inversely correlated with the blood lactate level but not with the blood sugar. Lactate infusions also lowered plasma FFA in normal dogs, with elevated circulating FFA caused by an infusion of norepinephrine. Neither acetylcholine nor nitroglycerine infusions had any marked effect on the plasma FFA. It is concluded that lactic acid has a direct effect on the release of FFA which does not require the presence of insulin and is independent of the blood glucose concentration. M.G.B.

Munke, Arne (Dept. of Med., Centrallasarettet, Karlskrona, Sweden): A MASS SURVEY TO TRACE PREVIOUSLY UNKNOWN DIABETES MELLITUS: A PRELIMINARY REPORT. Acta Med. Scand. 176:169-79, August 1964.

Examination for diabetes was made between 1958 and 1961 in the county Blekinge, Sweden. A total of 97,862 persons were tested for diabetes, which included 80 per cent of the population over ten years of age in the county. Postprandial urine samples were used as screening material and were tested for glucose by the Clinistix method. One-thousand, two-hundred and eighteen diabetics (12.4 per thousand of the

population tested) were encountered. Eight-hundred and forty-six (8.6 per thousand) of these were known diabetics. Three-hundred and seventy two (3.8 per thousand) were previously undiagnosed. Two-hundred and fifty-seven of these cases were diagnosed by the glucose tolerance test, and 115 cases by fasting blood sugar values. In women from sixty-six to seventy-nine years of age, and men from seventy to seventy-nine years of age, over forty per thousand of those tested were diabetic. Glycosuria of both diabetic and nondiabetic origin occurred in sixteen per thousand of 97,862 persons examined. B.F.K.

Nadon, Grant W.; Little, J. Alick; Hall, W. E.; and O'Sullivan, Michael O. (Univ. of Toronto and St. Michael's Hosp., Toronto, Ont.): A COMPARISON OF THE ORAL AND INTRAVENOUS GLUCOSE TOLERANCE TESTS IN NON-DIABETIC, POSSIBLE DIABETIC AND DIABETIC SUBJECTS. Canad. Med. Ass. J. *91*:1350-53, Dec. 26, 1964.

The results of the standard three-hour oral glucose tolerance test and the intravenous tolerance test performed on the same subjects were compared to determine their value in the diagnosis of borderline diabetes. Eighty-three tests were carried out in eighty-one subjects including thirty-eight normals, twenty-three possible diabetics and twenty-two known diabetics. For the determination of disappearance rate of glucose from the blood, the logarithms of the mg. per 100 ml. glucose in excess of a fasting level were plotted against time. The slope of this line (K) was determined by the method of least squares. The constant K disagreed with the oral glucose tolerance test classification, especially in the possible diabetic and nondiabetic groups. Also the correlation coefficients between K and oral glucose tolerance test values were not impressive. The tests agreed in the diagnosis of the frank diabetics but disagreed in the possible diabetic and normal groups. The results cast doubt on the accuracy of either test in diagnosing patients with early diabetes. Technically, the intravenous glucose tolerance test is difficult and may cause phlebitis. B.F.K.

Oyama, Jiro; and Platt, William T. (Environmental Biology Div., National Aeronautics and Space Administration, Ames Res. Center, Moffett Field, Calif.): CARBOHYDRATE METABOLISM OF MICE EXPOSED TO SIMULATED CHANGES IN GRAVITY. Amer. J. Physiol. *207*:411-14, August 1964.

Unrestrained mice were centrifuged for varying periods ranging from one-half to ten hours at 2.5, 5, and 10 X gravity. Liver glycogen and blood glucose levels increased significantly depending on the g load and exposure time. Adrenalectomy completely abolished the glycogen deposition response. Unweaned mice did not respond. Blood corticosterone increased significantly prior to the deposition of glycogen. Centrifuged fed mice deposited three times the amount of glycogen of fasted mice. The length of the fast before centrifugation (eighteen hours to three days) did not affect the amount of glycogen deposited during centrifugation. It is concluded that the increased glycogen deposited following centrifugation is effected by an increased elaboration of adrenal corticosterone. M.G.B.

Porte, Daniel, Jr.; and Entenman, Cecil (Biological and Medical Sciences Div., U.S. Naval Radiological Defense Lab., San Francisco, Calif.): FATTY ACID METABOLISM IN SEGMENTS OF RAT INTESTINE. Amer. J. Physiol. *208*:607-14, April 1965.

The in vitro metabolism of albumin-bound palmitic acid-1-C-14 by the segments of small intestine was studied. Tissue uptake, esterification, and oxidation of the fatty acid were measured separately and found to respond independently to altered incubation conditions. Uptake was reversible, and did not require glucose or oxygen. It was not inhibited by fluoride or arsenate. Esterification required both glucose and oxygen, but was unaffected by insulin. It was depressed by succinate and almost completely inhibited by fluoride and arsenate. Oxidation was a minor fate for fatty acid. It was independent of glucose but inhibited by succinate, fluoride, and arsenate. Sodium taurocholate stimulated uptake, but not esterification. The reversibility of FFA uptake by gut raises the possibility that some of the circulating FFA in plasma may originate in the intestine. M.G.B.

Reisner, S. H.; Forbes, A. E.; and Cornblath, M. (Dept. of Ped., Univ. of Illinois, College of Med.; and Res. and Educational Hosp., Chicago, Ill.): THE SMALLER OF TWINS AND HYPOGLYCEMIA. Lancet *1*:524-26, March 6, 1965.

Reports in the past have disclosed that the smaller of twins of dissimilar birthweight often displays reduced physical and mental achievement. A possible etiological factor for this discrepancy is hypoglycemia, a finding noted in infants with low birthweight for their gestational age. A longitudinal survey was made of eleven infants who were significantly smaller than their twin and exhibited signs of neonatal hypoglycemia. All were found to have blood glucose values below 20 mg. per 100 ml. in the neonatal period and were treated with intravenous dextrose initially and later with corticotrophin or cortisone. Follow-up studies on seven sets of twins show that in six instances the hypoglycemic twin has achieved the same physical and mental development as his normoglycemic twin. In one set the hypoglycemic infant is retarded and his nonaffected twin has hydrocephalus. T.G.S.

Rodbell, Martin; and Scow, Robert O. (Lab. of Nutrition and Endocrinology, Nat'l. Institute of Arthritis and Metabolic Dis., Nat'l. Institutes of Health, Bethesda, Md.): METABOLISM OF CHYLOMICRONS AND TRIGLYCERIDE EMULSIONS BY PERFUSED RAT ADIPOSE TISSUE. Amer. J. Physiol. *208*:106-14, January 1965.

The uptake and metabolism of chylomicrons and artificial emulsions of triglycerides by adipose tissue have been studied in the perfused parametrial fat body of the rat. The triglyceride preparations were labeled with either glyceryl-C-14 or with glyceryl-C-14 and palmitate-H-3. The uptake of both chylomicrons and emulsions was proportional to the blood triglyceride concentration and to the duration of infusion; the uptake of chylomicron triglycerides was about 40 per cent greater than that of the artificial emulsion. About two thirds of the triglycerides removed were hydrolyzed to glycerol and fatty acids and the rest was retained, without being hydrolyzed, in the fat cells. The uptake and metabolism of triglycerides was greatly reduced when the fat donors were deprived of food for two days. About 70 per cent of the fatty acids cleaved from blood triglycerides were incorporated into tissue lipids, whereas less than 15 per cent of those infused as free fatty acids were esterified by the perfused adipose tissue. Labeled glycerol was released to the venous blood for several minutes after the blood stream had been flushed of labeled

triglycerides. The findings suggest that a major part of the hydrolysis of blood triglycerides occurred after the triglycerides had been removed from the blood stream and that hydrolysis is an important factor in the removal of triglyceride from blood by adipose tissue. M.G.B.

Schapiro, Robert H.; Scheig, Robert L.; Drummey, Gladys D.; Mendelson, Jack H.; and Isselbacher, Kurt J. (Depts. of Med. and Psychiatry, Harvard Med. Sch.; and Medical and Psychiatric Serv., Mass. Gen. Hosp., Boston, Mass.): EFFECT OF PROLONGED ETHANOL INGESTION ON THE TRANSPORT AND METABOLISM OF LIPIDS IN MAN. New Eng. J. Med. 272:610-15, March 25, 1965.

Ten male subjects were maintained on a low sodium diet containing 1800 to 2400 calories with multivitamin supplementation. After a three-day control period they were placed on thirty to forty ounces of forty-three per cent alcohol per day. The study was continued for twenty-four days after which alcohol was abruptly withdrawn and the patients were observed for an additional eight days. Serum ethanol levels of 200 to 400 mg. per 100 ml. were achieved resulting in the following consistent changes in serum lipids: (1) At moderate blood ethanol levels, striking increases in serum triglycerides, producing a lactescent serum in three patients. (2) With higher blood ethanol levels a fall in serum triglyceride to or below the initial level and (3) At high ethanol levels marked increases in serum free fatty acids. Gas chromatographic studies of the free fatty acids in the serum suggested that an increased mobilization of fatty acids from adipose tissue probably occurred when the blood ethanol levels were extremely high. Decreased hepatic release of triglycerides was suggested as the mechanism for the drop in blood triglyceride levels whereas increased fat mobilization presumably through the hypophyseal-adrenal pathways was postulated as a likely cause for the elevated serum NEFA levels noted when the serum ethanol levels were markedly elevated. B.R.B.

Schelling, Jean-Louis; Tetreault, Leon; Lasagna, Louis; and Davis, Miles (Dept. of Med., Johns Hopkins Univ. School of Med., Baltimore, Md.; and The Faculty of Med., Univ. of Montreal, Montreal, Que.): ABNORMAL TASTE THRESHOLD IN DIABETES. Lancet 1:508-12, March 6, 1965.

In the past, a decreased taste sensitivity for sugar has been described in diabetics. In order to evaluate further the taste threshold in diabetes, four groups of carefully categorized diabetic subjects were matched with nondiabetic control subjects for age, sex, race, weight, type of diabetes, etc., and studied for their ability to taste glucose and sodium chloride. Glucose concentrations of 2, 4, 8, 16, 32 and 64 mg. per ml. and NaCl concentrations of 0.025, 0.05, 0.1, 0.2, 0.4, 0.8, 1.6, 3.2 and 6.4 mg. per ml. were employed and the ability of the patient to differentiate these solutions from distilled water was used as an end-point. The mean threshold for glucose tasting in uncontrolled diabetics was 29.9 mg./ml. for one group and 22.3 mg./ml. for another. In two groups of controlled diabetics, it was 15.4 and 16.0. The means for matched controls ranged from 9.0 to 20.3 mg./ml. No correlations were found between impaired taste threshold and blood sugar, but the diabetics as a group appeared to have an elevated taste threshold for sugar. Even asymptomatic diabetics displayed this defect, and its presence could not be related to neuropathy. The data suggest that taste impairment may be an early manifestation of diabetes and possibly could be a genetic manifestation. The threshold for NaCl was no different in diabetics than in controls. T.G.S.

Voll, Artur (Medical Dept., Univ. Hosp., Oslo, Norway): THE TOLBUTAMIDE TOLERANCE TEST. Acta Med. Scand. 177:89-93, January 1965.

The tolbutamide tolerance test was studied in thirty-five individuals whose ages varied from fifteen to eighty-one years. Thirteen were nondiabetics according to the common criteria, six were diabetics with stable type of diabetes, whereas sixteen patients suffered from various diseases. A standard glucose tolerance test was performed also in twenty-six of the individuals. In the nondiabetics and the six diabetics with stable type of disease there was good correlation of the two tolerance tests. Sixteen of the patients were divided into three groups. In one group of six patients with diabetic symptoms, glycosuria or elevated fasting blood sugars, the tolbutamide tolerance and the glucose tolerance tests were those of the diabetic state. In a second group of six cases, including malabsorption syndrome, chronic nephritis and liver disease, there was no conformity of the two tests. In some with hepatic derangement the glucose tolerance test was of the diabetic type, whereas the tolbutamide tolerance test showed normal pancreatic function. On the other hand, in three of the patients the tolbutamide tolerance test indicated a diabetic type of curve, whereas the glucose tolerance test was normal. In a third group of four patients, three with myocardial infarction and one with pneumonia, the fasting blood sugar was slightly elevated. The tolbutamide tolerance tests were normal. A glucose tolerance test was not done in these four patients. B.F.K.

Wallace, John M.; and Harlan, William R. (Dept. of Medicine, Duke Univ. Med. Center, and Veterans Admin. Hosp., Durham, N.C.): SIGNIFICANCE OF EPINEPHRINE IN INSULIN HYPOGLYCEMIA IN MAN. Amer. J. Med. 38:531-39, April 1965.

This is a study of the change in blood glucose, plasma epinephrine and serum free fatty acids in induced insulin hypoglycemia in nine normal students, one diabetic patient and five psychiatric patients undergoing insulin therapy. The first group received 30 to 45 U. Crystalline Insulin and 45 U. glucagon-free insulin intramuscularly, the diabetic patient 50 U. of NPH (Isophane Insulin) and the psychiatric patients 45 U. (three patients) and 120 U. (two patients) of Crystalline Insulin.

Blood sugar and serum fatty acids fell to their lowest levels about forty-five minutes after I.M. insulin. The highest initial epinephrine peaks were correlated with the lowest blood glucose levels and the greatest subsequent increases in blood glucose levels after the first hour, and results suggested that the posthypoglycemic intolerance for glucose observed by others may not be due to increased plasma epinephrine at that time. Data are also presented suggesting that the rise in plasma FFA following induction of hypoglycemia is not mediated by increases in epinephrine or norepinephrine. Repeated insulin-induced hypoglycemia in the normal results in less endogenous epinephrine secretion, an observation which may be pertinent to the insulin-treated diabetic patient who has experienced multiple hypoglycemic reactions. S.B.B.