

ABSTRACTS

Anderson, John; Hollifield, Guy; and Owen, John A., Jr. (Dept. Intern. Med., Univ. of Virginia, Charlottesville, Va.): THE EFFECTS OF CAFFEINE, DEOXYRIBOSE NUCLEIC ACID AND INSULIN ON THE METABOLISM OF GLUCOSE BY ADIPOSE TISSUE IN VITRO. *Metabolism* 15:30-38, January 1966.

Caffeine or coffee raised the blood glucose levels of obese hyperglycemic mice in earlier work reported by Kuffinec and Mayer. Using the rat epididymal fat pad the actions and interactions of caffeine, DNA and insulin upon C-14-O₂ production and C-14 lipid incorporation from glucose-1-C-14 were studied. The results demonstrated the anticipated stimulation derived from insulin action; no effect from DNA, and an inhibitory effect exerted by caffeine. DNA and insulin singly or together were found to be antagonistic to caffeine in this system. The basis for the action of caffeine and the counteractions observed with DNA and insulin is not known. C.R.S.

Barnett, Carol A.; and Whitney, J. E. (Univ. of Arkansas Med. Center, Dept. Physiol., Little Rock, Ark.): THE EFFECT OF DIAZOXIDE AND CHLOROTHIAZIDE ON GLUCOSE UPTAKE IN VITRO. *Metabolism* 15:88-93, January 1966.

The basal glucose uptakes of rat hemidiaphragms and epididymal fat pads were consistently reduced by the combination of diazoxide and chlorothiazide. The insulin responsiveness of these tissues was unimpaired by these compounds. Neither tolbutamide or a high KCl content in the incubation medium reversed the suppression of basal glucose uptake by the benzothiazides. These observations support the opinion that hyperglycemia induced by these compounds is the result of impaired glucose uptake by peripheral tissues. C.R.S.

Beck, Paul; Schalch, Don S.; Parker, Mary L.; Kipnis, David; and Daughaday, William H. (Metab. Div., Dept. of Med., Wash. Univ. School of Med., St. Louis, Mo.): CORRELATIVE STUDIES OF GROWTH HORMONE AND INSULIN PLASMA CONCENTRATIONS WITH METABOLIC ABNORMALITIES IN ACROMEGALY. *J. Lab. Clin. Med.* 66:366-79, 1965.

Previous studies have shown that plasma levels of growth hormone are usually elevated in patients with clinically active and inactive acromegaly. Hypoglycemia is a potent stimulus for growth hormone secretion in the normal subject. In the hypopituitary subject the administration of growth hormone is a potent stimulus for the secretion of insulin. It might be postulated that factors influencing growth hormone secretion would exercise less control in the acromegalic but little data pertaining to this assertion have been reported. The authors induced acute hypoglycemia in twelve acromegalics by intravenous insulin administration and found that this manipulation caused smaller increments of growth hormone levels over fasting levels than in controls. The administration of intravenous tolbutamide to nondiabetic acromegalics resulted in higher insulin levels and less hypoglycemia than in controls. Oral glucose loading in acromegalics was associated with an exaggerated rise in insulin, minor decreases in growth hormone and a reduced rate of glucose utilization. The insulin antagonism displayed by the acromegalics was not thought to be related to plasma NEFA as fasting NEFA levels were normal. T.G.S.

Berkow, Joseph W.; Shugarman, Richard G.; Maumenee, A. Edward; and Patz, Arnall (Filbert Foundation Lab., Wilmer Ophth. Instit., Johns Hopkins Hosp., Baltimore, Md.): A RETROSPECTIVE STUDY OF BLIND DIABETIC PATIENTS. *JAMA* 193:867-70, Sept. 13, 1965.

A study of certain clinical features of 180 unselected blind diabetic patients who had received guide dogs from Seeing Eye, Inc., over a 17-yr. period, 1947-1964. In the group there were eighty-five deceased and ninety-five living diabetic patients, and two thirds had at most light perception in both eyes at the date the patient received the dog. The group was young, with a mean age of 14.2 yrs. at onset of diabetes, and blindness supervened 17.4 yrs. after clinical onset of diabetes. The striking finding was the short life duration (mean age at death 35.9 yrs.) and especially the short life span (5.8 yrs.) after blindness in the eighty-five deceased diabetics. The short use of the dogs, mean 3.5 yrs. in both groups, living and deceased, was an indication of the severe limitations inherent in diabetics who have become totally blind. S.B.B.

Cocco, Arthur E.; and Hendrix, Thomas R. (Dept. of Med., The Johns Hopkins Univ. Sch. of Med. and Hosp., Baltimore, Md.): THE EFFECT PRODUCED BY PHLORIZIN AND HYPERTONIC SALINE ON SUGAR MOVEMENT FROM BLOOD TO INTESTINAL LUMEN. *Bull. Johns Hopkins Hosp.* 117:296-305, November 1965.

The absorption of glucose, 3-O-methylglucose and xylose from the small intestine of rats was inhibited by adding phlorizin to the sugar solutions that were introduced into the lumen of the gut. However, phlorizin had no effect on the mechanism that prevented the appearance of appreciable amounts of each sugar in the lumen of the jejunum and ileum upon raising the blood plasma levels to 1,000 mg. per cent. O.V.S.

Constam, G. R. (Medizinischen Universitätspoliklinik, Zürich, Switzerland): ZUR SPAETPROGNOSE DES DIABETES MELLITUS (Long-term Prognosis of Diabetes Mellitus). *Helv. Med. Acta* 32:287-306, 1965.

Verbatim Summary: The average duration of diabetes has been prolonged more than three times since 1922, and life expectancy is estimated at least three quarters of the normal. This is the consequence of insulin, of modern means for the treatment of infections and for improving circulation, of earlier diagnosis and of better trained physicians and patients.

Mortality, especially in younger diabetics, is reduced, but it is still higher than for the average population. Ketoacidosis, formerly the main cause of death, is still important in infantile and juvenile diabetes, but in adults it has been replaced by renal, cardiac or peripheral circulatory failure.

Examinations of diabetics 20, 25, 30, 35 and 40 yrs. after the first manifestation of their disease showed that with increasing age and longer duration of diabetes, late symptoms become more frequent. They appear independent of the severity of diabetes, but dependent on the quality of treatment. This is especially true for diabetes starting during in-

fancy and childhood. The treatment of the first years appears decisive for the late prognosis of diabetes. An early start with appropriate therapy gives the best chances for diabetics to remain active and normal for 30 to 40 yrs. Even 40 yrs. after the onset of diabetes the majority of diabetics who were treated well from the start, were found to be about as active as normal persons, although at this time they were not completely free from late diabetic symptoms.

An explanation for the statistically proven influence of treatment on the prognosis of diabetes cannot be given at the present time, as the relations between diabetes and the vascular changes are not yet fully understood.

The influence of the quality of treatment on long-term prognosis in diabetes is missed in patients with erroneous diagnosis or too short a period of care (less than 20 yrs.), or in "insulin virtuosos," or in a special, unusually benign type of diabetes (below 3 per cent of our patients).

The working capacity is also dependent on the age of the individual, the duration of diabetes, the onset and the quality of treatment. Well controlled diabetics—for this intelligence and energy are indispensable—have an excellent record as workers in many fields.

Incapacity for work is due, in younger people frequently to blindness, in older individuals to cardiac or cerebral or peripheral vascular insufficiency. J.A.G.

De Caro, Lucio G.; Fattorini, Ada; and Gorini, Maurizio (Inst. of Med. Path. and Clin. Methodology, Univ. of Pavia, Pavia, Italy): PLASMA NEFA RESPONSE TO A GLUCOSE LOAD IN PATIENTS WITH DIABETES, ARTERIOSCLEROSIS AND OBESITY. *Metabolism* 15:65-69, January 1966.

Plasma free fatty acid (FFA) and blood glucose levels were measured serially following a glucose load administered to control subjects and to patients with arteriosclerotic disease, obesity or diabetes. A decrease in FFA was observed in the control group. This effect was not altered by the administration of methopyrone or tolbutamide. An abnormal response was produced in the controls when given prednisone; this was reversed by the simultaneous administration of tolbutamide. Diabetic patients exhibit abnormal FFA responses to glucose administration. These were corrected by treatment with insulin or tolbutamide except in three instances of Achard-Thyrs syndrome. Two of the latter improved in their FFA response following methopyrone administration suggesting that corticosteroids may be involved in the altered FFA response. Arteriosclerotic (53 per cent) and obese (41 per cent) patients manifested abnormal FFA responses to the glucose load. These abnormalities were reversed by tolbutamide or methopyrone treatment despite the absence of abnormal blood glucose levels in these patients. The metabolic abnormalities reflected in the FFA responses may be related to functional alterations in adipose tissue independent of changes in blood glucose. C.R.S.

Fisher, Gail F.; and Vavra, Helen M. (Operational Methods Sect., Diabetes and Arthritis Branch, Div. of Chronic Diseases, Public Health Service, Washington, D.C.): SCREENING HIGH-YIELD GROUPS FOR DIABETES. *Public Health Rep.* 80:961-68, November 1965.

Reports of five diabetes screening programs sent from all parts of the United States to the Public Health Service were

re-evaluated to determine the yield of new cases that would have been discovered if certain known predetermining factors had been taken into consideration instead of screening the entire population. Since about one half of the cases of diabetes in the country are undiagnosed, it is the author's contention that it is essential to screen groups that will yield the greatest number of new cases. Accordingly, they evaluated the yield in the various screening projects that would have resulted if age, family history of diabetes, weight and history of large babies had been used to determine the population to be screened. All of the factors studied showed a correlation with the number of new cases discovered. There were more new cases found as percentage of overweight increased, and there were more new cases found among mothers of larger babies as opposed to a group of mothers who had babies of normal weight. The most important two categories, however, in their opinion, were age and family history of diabetes. They concluded that, if they had screened only persons over age forty and, in addition, those under forty who had a family history of diabetes, they would have discovered essentially the same number of new cases as would have been discovered by screening the entire population. Using these two criteria, most diabetic parents of large babies and obese persons with diabetes would have been found. In a large federal employee screening project, if only those over age forty and those under forty who had a family history of diabetes were tested, 95 per cent of the new cases would have been discovered. P.S.E.

Hellerström, Claes (Histolog. Dept., Univ. of Uppsala, Uppsala, Sweden): OXYGEN CONSUMPTION OF ISOLATED PANCREATIC ISLETS OF MICE STUDIED WITH THE CARTESIAN-DIVER MICRO-GASOMETER. *Biochem. J.* 98:70-90, January 1966.

The pancreas of adult female mice with the obese hyperglycemic syndrome was removed and islets dissected out. On incubation in Cartesian divers, the micro-dissected islets consumed oxygen at a steady rate for more than two hours. When glucose was added to the incubation medium, oxygen consumption increased and continued at a steady increased rate. This technic is suggested for the study of mammalian islets. P.H.W.

Hockaday, T. D. R. (Dept. of the Regius Prof. of Med., Radcliffe Infirmary, Oxford, England): THE EFFECT OF ADRENALECTOMY ON BLOOD PYRUVATE IN CATS INJECTED WITH GLUCOSE AND INSULIN. *J. Endocr.* 33:163-69, October 1965.

Injection of 290 mg. of glucose per kilogram body weight plus 0.5 U. insulin per kilogram into cats caused a marked rise of blood pyruvate concentration in adrenalectomized animals, but not in normal intact animals. Evisceration did not greatly affect this pattern of response. It is suggested that a more rapid utilization of glucose in peripheral tissues may have been responsible for increased formation of pyruvate in the adrenalectomized animals.

Forty-five or sixty minutes after the injection of 1.5 U. insulin per kilogram together with 290 mg. of glucose per kilogram, there was moderately severe hypoglycemia in intact cats. Adrenalectomized animals developed comparable hypoglycemia after 0.5 U. insulin per kilogram. Hypoglycemia was accompanied by an increase in blood pyruvate in the intact animals but not in the adrenalectomized ones. Ad-

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ministration of cortisol to the adrenalectomized animals did not affect these results. It is suggested that release of epinephrine accounted for the increase of blood pyruvate concentration in the intact hypoglycemic animals. H.T.N.

Ismail, Ahmed A.; Khabifa, Kamel; and Madwar, Kasdy R. (El Mofty Metabolic Unit, Biochem. Dept., Cairo Univ., Cairo, U.A.R.): CAPILLARY LOSS OF RADIO-IODINATED SERUM ALBUMIN IN DIABETICS. *Lancet* 2:810-13, Oct. 23, 1965.

Thickening of the capillary wall is a common finding in diabetics. Since the normal capillary wall has uniform pores, it is reasonable to propose that its thickening could be associated with a reduction of the rate of transfer of a molecule the size of albumin from the intravascular to the extravascular space. To test this proposal, the authors administered radioiodinated serum albumin to 41 normal individuals and 59 diabetic subjects and measured its rate of disappearance from plasma. From one-half to three and one-half hours after injection, the control patients showed an average decrease in radioactivity of 23 per cent. The diabetics had a decrease of only 14.7 per cent ($p < 0.01$). Although the reduced rate of albumin disappearance in diabetes could result from a decreased number of capillaries or a low intercapillary pressure, the most likely explanation appears to be a reduction in capillary permeability. T.G.S.

Joplin, G. F.; Fraser, Russell; Hill, D. W.; Oakley, N. W.; Scott, D. J.; and Doyle, F. H. (Depts. of Med. and Radio-diagnosis, Postgraduate Med. Sch. of London, London, England): PITUITARY ABLATION FOR DIABETIC RETINOPATHY. *Quart. J. Med.* 34:443-62, October 1965.

Verbatim Summary: In thirty-eight diabetics with retinopathy selected as not too advanced, pituitary function has been reduced by trans-ethmoidal implantation of yttrium-90 at one of three dose levels. The degree of pituitary ablation achieved has been graded (slight, moderate, maximal) from subsequent tests of adrenal and thyroid function and the changes in insulin requirements.

To assess the effects on retinopathy, an equivalent control group of twenty-three retinopathy patients has been similarly followed by retinal photography and visual acuity measurements; the main comparison has been between those with adequate photographic follow-up—i.e., nineteen implanted subjects followed for a mean of eighteen months (range six to fifty-six months) and twenty-two control subjects followed for a mean of ten months.

Five components of retinopathy-hemorrhages, new vessels, venous dilatation, exudates, and retinitis proliferans—have been separately evaluated. In many control cases there has been no change in any of the components, but over-all a slight deterioration has been observed. In the implanted series, however, improvement has been seen in hemorrhages (50 per cent), in new vessels (30 per cent), and in venous dilatation (20 per cent); exudates remained unchanged while retinitis proliferans has continued to advance.

Further follow-up is needed to appraise the importance of the degree of pituitary ablation. O.V.S.

Katsoyannis, Panayotis G.; Tometsko, Andrew M.; Ginos, James Z.; and Tilak, Manohar A. (Div. of Biochem., Med. Res. Center, Brookhaven National Lab., Upton, N.Y.): INSULIN PEPTIDES. XI. THE SYNTHESIS OF THE B CHAIN OF

HUMAN INSULIN AND ITS COMBINATION WITH THE NATURAL A CHAIN OF BOVINE INSULIN TO GENERATE INSULIN ACTIVITY. *J. Amer. Chem. Soc.* 88:164-66, Jan. 5, 1966.

The authors describe the chemical reactions involved in the synthesis of the B chain of human insulin. When this was coupled with the natural A chain of bovine insulin, it gave a product in 4 to 8 per cent yield which had considerable insulin activity. P.H.W.

Katsoyannis, Panayotis G.; Tometsko, Andrew M.; and Zalut, Clyde (Div. of Biochem., Med. Res. Center, Brookhaven National Lab., Upton, N.Y.): INSULIN PEPTIDES. XII. HUMAN INSULIN GENERATION BY COMBINATION OF SYNTHETIC A AND B CHAINS. *J. Amer. Soc.* 88:166-67, Jan. 5, 1966.

The authors describe what appears to be the first chemical synthesis of a human protein. Combination of synthetic A and B chains of human insulin gave a product in low yield (2 per cent) with considerable insulin activity in mice. It is hoped that by an improved method this yield can be raised to 45-55 per cent. P.H.W.

Lawrence, R. D. (London, England): EVANESCENT PAROTITIS IN DIABETES. (Correspondence). *Brit. Med. J.* 2:1432, Dec. 11, 1965.

The correspondent describes a temporary, painful parotitis in approximately twenty diabetic patients and comments that no previous reference to this condition in diabetics has been described. Earache, usually bilateral, with an obvious swollen and tender parotid gland is noted. No sepsis in the mouths of the patients or in the juice extracted from the duct to the parotid gland was found. The condition usually subsides with time. Cause remains unexplained. R.F.B.

Linfoot, J. A.; and Greenwood, F. C. (Donner Lab., Univ. of California, Berkeley, Calif., and Div. of Chem. and Biochem., Imperial Cancer Res. Fund, London, Eng.): GROWTH HORMONE IN ACROMEGALY: EFFECT OF HEAVY PITUITARY IRRADIATION. *J. Clin. Endocr.* 25:1515-18, November 1965.

Plasma growth hormone levels (HGH) were measured by the radioimmunoassay of Hunter and Greenwood in thirty-three acromegalic patients. Fourteen plasma samples obtained in the fasting state were analyzed from patients prior to the heavy-particle pituitary irradiation and nineteen samples were analyzed from patients six months to two years after treatment. The mean HGH level of nonirradiated acromegalics was 40.8 $\mu\text{g./ml.}$, it was only 5.5 $\mu\text{g./ml.}$ in patients after pituitary irradiation. It has been noted that heavy-particle irradiation between 4,000 and 9,000 rads is more effective than other types of radiation therapy. Moreover, it does not involve risks of surgical procedures, and causes only mild hypopituitarism. O.V.S.

Luntz, George (Birmingham Chest Clin., Birmingham, Eng.): NEW PAPER STRIP METHOD FOR BLOOD GLUCOSE: REPORT ON USE OF "DEXTRSTIX" REAGENT STRIPS. *Midl. Med. Rev.* 4:97-102, 1965.

A new, rapid paper strip colorimetric test for determining blood glucose values is described. It is based on the reaction of glucose oxidase, peroxidase and a chromagen system. Results show the method to be very accurate in the range of 40-130 mg./100 ml. Blood glucose values of a higher range tend to be underestimated. This test seems most useful as a screening procedure and to establish diagnosis in emergencies. J.A.G.

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MacDonald, I. (Dept. Physiol., Guy's Hosp. Med. Schl., London, England): THE LIPID RESPONSE OF YOUNG WOMEN TO DIETARY CARBOHYDRATES. *Amer. J. Clin. Nutr.* 16:458-63, June 1965.

Five healthy female volunteers aged 21-25 yrs. were studied in a metabolic unit during a control period on ad lib diet, for twenty-five days on a diet of lean meat, green vegetables, and fruit ad lib to which were added 100 ml. of skim milk and 450 gm. of raw, highly purified maize starch daily. The subjects reverted to normal diet for six weeks and during the subsequent twenty-five days ate the same experimental diet except that the starch was replaced by sucrose. Vitamins were taken each day. No gastrointestinal disturbance was encountered. Mean weight loss of 0.7 and 0.6 kg. occurred on the two diets, considered not to be significant. Blood for lipid values and biopsy of adipose tissue were obtained after a ten-hour fast during the control period, four days after commencing the diet and thereafter at weekly intervals. Total lipids, cholesterol, sterol esters, glycerides, and phospholipids, as well as the lipid content of the adipose tissue samples, were compared with the previously obtained results in a group of male volunteer subjects reported elsewhere (MacDonald, I. and Braithwaite, D. M., *Clinical Science* 27:23, 1964).

During the period on diet containing starch, the changes in lipid fractions in the serum of the women were similar to those found previously in men. On the starch diet, total lipids, sterol esters, total cholesterol, and phospholipids decreased in women, whereas the men showed a lesser decrease in total lipids, sterol esters, cholesterol, and phospholipids. No change on the starch diet was noted in either men or women in glycerides, free fatty acids, or free sterols.

On the sucrose diet, the women showed a decrease in total lipid, total cholesterol, phospholipid, glycerides, free fatty acids, and free sterols, whereas the men had shown an increase in total lipids, total cholesterol, and a striking increase in glycerides, free fatty acids, and free sterols. The men had shown no change on a sucrose diet in sterol esters or phospholipid.

A striking resistance to change in the composition of depot fat in women was again noted based on the biopsy material obtained, confirming previous data (MacDonald, I. and Barry, P. J. C., *Amer. J. Clin. Nutr.* 15:158, 1964).

The above findings are interpreted as compatible with the view that dietary sucrose in men leads to a serum lipid picture similar to that in ischemic heart disease. A reverse pattern was found in the young women who were the subjects of the current study. R.F.B.

Mayne, N. (Gen. Hosp., Birmingham, England): NEUROPATHY IN THE DIABETIC AND NONDIABETIC POPULATIONS. *Lancet* 2:1313-16, Dec. 25, 1965.

The author states that traditional surveys describing the characteristics of diabetic neuropathy tend to relate the more severe and unusual manifestations of the syndrome and also fail to compare them to neurological deficits found in the nondiabetic. In an effort to describe the incidence and severity of diabetic neuropathy and compare the findings to a control series of patients the author surveyed 222 diabetics and 110 nondiabetics from his outpatient clinic. From the standpoint of symptoms of neuropathy the greatest differences between diabetics and controls were: pain, 18 versus 3 per cent and

paresthesias, 21 versus 6 per cent. Night cramps, cold feet and burning feet were common in both groups. In diabetics under forty, objective signs such as absent ankle jerks and knee jerks were common but were largely absent in age-matched controls. After age forty, these findings were quite prevalent in both groups. Severe neuropathic manifestations were rare. T.G.S.

Mertz, Walter; Roginski, Edward E.; and Schroeder, Henry A. (Div. of Biochem., Walter Reed Army Inst. of Res., Washington, D.C. and Brattleboro Retreat, Brattleboro, Vt.): SOME ASPECTS OF GLUCOSE METABOLISM OF CHROMIUM-DEFICIENT RATS RAISED IN A STRICTLY CONTROLLED ENVIRONMENT. *J. Nutr.* 86:107-12, May 1965.

Rats were raised in a special laboratory on a diet deficient in chromium for twelve to twenty-five months and subjected to intravenous glucose tolerance tests. Impairment in glucose removal rate was corrected by oral and intravenous administration of chromium. Epididymal fat tissue from chromium-deficient rats exhibited decreased CO₂ production from labeled glucose in the presence or absence of insulin. Chromium deficiency may produce diabetes, impaired growth and survival in rats and mice. Chromium may enhance the reaction of insulin with its acceptor site on membranes. A.R.C., JR.

Muller, Sigfrid A.; and Winkelmann, R. K. (Sect. of Derm., Mayo Clinic and Mayo Found., Rochester, Minn.): NECROBIOSIS LIPOIDICA DIABETICORUM. RESULTS OF GLUCOSE TOLERANCE TESTS IN NONDIABETIC PATIENTS. *JAMA* 195: 433-36, Feb. 7, 1966.

Of 171 patients with necrobiosis lipoidica diabeticorum seen at the Mayo Clinic, diabetes mellitus had been demonstrated to be present in 111. Diabetes had been excluded from the remaining sixty patients only by one or two normal fasting blood sugar determinations. Of these nineteen were available for recall and were given an oral glucose tolerance test. Three of these showed a diabetic curve and of the remaining sixteen who were given a standard oral cortisone glucose tolerance test, an additional group of five showed an abnormal result. They concluded that all patients with this skin condition should still be considered presumptively diabetic. S.B.B.

Neale, G.; Clark, M.; and Levin, B. (Postgrad. Med. Sch. of London, and St. George's Hosp., Tooting Grove; Queen Elizabeth Hosp. for Children, London, England): INTESTINAL SUCRASE DEFICIENCY PRESENTING AS SUCROSE INTOLERANCE IN ADULT LIFE. *Brit. Med. J.* 2:1223-25, Nov. 20, 1965.

The known earlier findings based on quantitative estimation of enzyme activity in intestinal mucosa of failure to hydrolyse certain dietary disaccharides, as a congenital disorder in infants and children, are reviewed. Lactose intolerance resulting from lactase deficiency is being increasingly recognized in adults and is probably not uncommon. Sucrose intolerance due to absent sucrase activity in the jejunal mucosa and first becoming manifest in adult life has not been previously described.

The present report concerns a twenty-seven-year-old male with diarrhea after sucrose ingestion and failure of blood glucose levels to rise following sucrose by mouth. Jejunal mucosa biopsies were subsequently obtained by a Crosby capsule, specimens examined by dissecting, light, and electron microscopy, and lactase, maltase, palatinase, and sucrase activities measured.

In carbohydrate loading tests, complete intolerance to sucrose

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and some to starch was found. The enzyme measurements showed virtual absence of sucrase in the intestinal mucosa. In addition, there was a finding of reduced maltase and isomaltase (palatinase) activities. In view of previous studies indicating that sucrase and isomaltase (palatinase) enzymes together account for about 80 per cent of the total maltase activity of the intestinal mucosa in the human, it was felt that the reduced maltase activity and the impaired tolerance to starch were due to the absence of these two enzymes.

The acid diarrhea found and the associated abdominal distention are attributable to the large load of unsplit disaccharides reaching the colon.

Three previous instances of hereditary sucrose intolerance had been reported, all in childhood. In most instances the symptoms tend to improve with age. The present case occurring in an adult is either the only or extremely rare case reported.

In the present case, the possibility of acquired disaccharide intolerance could not be absolutely ruled out. The patient evidently developed the symptoms of an hereditary sucrose intolerance because of an acute gastroenteritis which unmasked the enzyme deficiency. With a sucrose-free diet, he subsequently became asymptomatic. R.F.B.

Nuttall, Frank Q. (Clin. Chem. Sect., Minneapolis Veterans Hosp., Minneapolis, Minn.): METABOLIC ACIDOSIS—DIABETIC. Arch. Intern. Med. 116:709-16, November 1965.

A symposium on acid-base balance is presented, with brief summaries of pathogenesis, clinical manifestations, laboratory findings and treatment of diabetic ketoacidosis. The summary is good although elementary. The author makes several good points in his presentation of treatment and discusses the controversy of giving moderate amounts of insulin initially for diabetic acidosis as opposed to the more usual technic of large doses. He also notes some cautions to be observed in correcting the acidosis too rapidly. P.S.E.

O'Sullivan, John B.; and Mahan, Clare M. (Diab. Field Res. Facility Diab. and Arthritis Program, Div. of Chron. Dis., U.S. Public Health Service, Brighton, Mass.): BLOOD SUGAR LEVELS, GLYCOSURIA, AND BODY WEIGHT RELATED TO DEVELOPMENT OF DIABETES MELLITUS. THE OXFORD EPIDEMIOLOGIC STUDY 17 YEARS LATER. JAMA 194:587-92, Nov. 8, 1965.

This is a follow-up seventeen years after the original diabetes survey (in 1946-47) of 3,245 persons out of a population of 5,089 persons in the town of Oxford, Massachusetts. The methods included blood sugar determinations on venous or capillary blood on all individuals (91 per cent within two hours after eating), simultaneous urine samples, and subsequent glucose tolerance tests among eighty-two patients with blood sugar levels above 140 mg. per 100 ml. (thirty-nine above 170 mg. per 100 ml.). The blood sugar was performed by either Folin-Wu or Somogyi-Nelson methods but reported in terms of the former.

With the advantage of a seventeen-year follow-up, analysis of the results could be more meaningful in terms of correlation between screening levels and new diabetes (previously known diabetics were excluded). The laboratory results were correlated with the degree of diabetes which was present or which subsequently developed. There was increasingly posi-

tive correlation of diabetes with blood sugar levels of 140, 170 per 100 ml. and 200 mg. per 100 ml. There was also a high correlation of the disease with a combination of an initial blood sugar value of over 170 mg. per 100 ml. combined with either glycosuria (62 per cent) or a subsequently repeated blood sugar level of over 140 mg. per 100 ml. (71 per cent). The presence of obesity (20 per cent overweight) was significant only when accompanied by an elevated blood sugar level (esp. over 170 mg. per 100 ml.) but not when present alone. S.B.B.

Partamian, J.; Rasio, E.; and Cabill, G. F., Jr. (Elliott P. Joslin Res. Lab. in the Dept. of Med., Harvard Med. Sch., the Diabetes Foundation, Inc. and the Peter Bent Brigham Hosp., Boston, Mass.): STUDIES USING THE INTRAPERITONEAL ASSAY ON THE STATE OF INSULIN IN RAT SERUM. Metabolism 15:70-75, January 1966.

The intraperitoneal injection of insulin standards and unknown solutions together with glucose-U-C-14 was performed using rats for the bioassay of insulin activity. The recovery of radioactivity in diaphragm or adipose glycogen of the animals served as the index of insulin sensitivity. Different effects were observed on the two tissues, muscle glycogen being higher in the fed state and adipose glycogen higher during fasting. There is more insulin effect on adipose tissue in vitro than in vivo. Histamine injected intraperitoneally increased muscle glycogen deposition but did not affect adipose glycogen significantly. Rat lymph failed to show insulin activity on either tissue although by immunoassay the lymph contained 77 per cent of the amount of insulin as did the pooled sera from the same animals. These experiments demonstrate that as little as 20 μ U./ml. of insulin may exert a significant metabolic effect and suggest that vascular permeability may play a role in insulin activity of serum factors upon tissue. Based on these observations the physiologic import of studies using in vitro assays to assess in vivo function is open to question. C.R.S.

Rosen, Barbara J.; and Tullis, James L. (Dept. of Med., New England Deaconess Hosp., and The Protein Foundation, Boston, Mass.): SIMPLIFIED DEFEROXAMINE TEST IN NORMAL, DIABETIC, AND IRON-OVERLOAD PATIENTS. CLINICAL OBSERVATIONS. JAMA 195:261-64, Jan. 24, 1966.

A study of the use of deferoxamine mesylate (2 ml. administered as a 25 per cent solution intramuscularly) as an iron chelating agent to test for iron storage disease. In addition to "iron-overload" patients with disorders of iron metabolism, sixteen normals and twelve diabetic patients were studied. The six-hour urinary iron excretion values were less than normal in diabetics before and after injection of deferoxamine while their total iron-binding capacity (transferrin) was also below normal. The patients with iron metabolic disturbances had a post-deferoxamine urinary iron excretion about nine times greater than normal. S.B.B.

Sanbar, Shafeek S.; Hetenyi, Geza, Jr.; Forbath, Nicholas; and Evans, John R. (Depts. of Med. and Physiol., Univ. of Toronto, Toronto, Ontario, Canada): EFFECTS OF INFUSION OF OCTANOATE ON GLUCOSE CONCENTRATION IN PLASMA AND THE RATES OF GLUCOSE PRODUCTION AND UTILIZATION IN DOGS. Metabolism 14:1311-23, December 1965.

Glucose turnover as influenced by intravenously administered sodium octanoate was measured in healthy dogs by isotope

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dilution technics. The infusion of octanoate resulted in a rise in plasma free fatty acid (FFA) accompanied by a significant fall in plasma glucose content. The rate of plasma glucose appearance (production) and disappearance (utilization) decreased by approximately 30 to 24 per cent of control values respectively. The apparent distribution space of glucose was not altered while the intermixing glucose mass was decreased during the infusion. The decrements in intermixing glucose mass and plasma glucose could be attributed to the reduction in glucose production, primarily the suppression of hepatic glucose release, which was quantitatively greater than the effect upon glucose utilization. A possible explanation for these findings lies in the stimulation of insulin secretion by ketone bodies derived from octanoate. C.R.S.

Skovborg, F.; Nielsen, Aa. V.; Schlichtkrull, J.; and Ditzel, J. (Hvidøre Hosp. and Novo Res. Inst., Copenhagen, Denmark): BLOOD VISCOSITY IN DIABETIC PATIENTS. *Lancet* 1:129-31, Jan. 15, 1966.

It has been postulated that a reduction in blood flow might be responsible for the development of the morphological changes in small blood vessels in diabetics. An increase in blood viscosity could be of importance in reducing flow. In this study the blood of sixteen diabetics (mean age, forty-two years; mean duration of diabetes, 20.9 yr.) was compared to sixteen healthy control subjects matched for age and sex. Viscosity was measured mechanically and hematocrits, fibrinogen determinations and serum protein electrophoretic studies were also made. Whole blood viscosity was found to be about 20 per cent greater in the diabetics. This difference was independent of the hematocrit and correlated positively with elevations of serum alpha-2-globulin and beta-globulin found in the diabetics. Since plasma viscosity was not increased, it was concluded that the increase in whole blood viscosity was due to aggregation of the red cells. Such aggregation could be the result of protein coating of the cells. T.G.S.

Stenger, Vincent; Henry, John; Cestarc, Edward; Eitzman, Donald; and Prystowsky, Harry (Depts. of Obstet. and Gynec., Path., and Pediat., Univ. of Florida Coll. of Med., Gainesville, Fla.): MOVEMENTS OF GLUCOSE IN THE HUMAN PREGNANT UTERUS. *Amer. J. Obstet. Gynec.* 94:261-67, Jan. 15, 1966.

The authors initiated the present studies to depict the normal or usual movements of the carbohydrate glucose into and out of the pregnant uterus and the handling of this substance by the fetus in utero. The data presented here give a description of the concentrations of glucose in the pregnant uterus of the human at rest under conditions as nearly normal as could be established. Comparison of output or uptake with corresponding concentration differences have yielded some information regarding possible placental transport mechanisms.

E.A.W.

Thornton, Raymond; and Horvath, Steven M. (Lab. of Environ. Stress, Univ. of California, Santa Barbara, Calif.): BLOOD SUGAR LEVELS AFTER EATING AND AFTER OMITTING BREAKFAST. *J. Amer. Dietetic Assoc.* 47:474-77, December 1965.

Blood glucose values were determined fasting and at one-

half, one and one-half, two and one-half, three and one-half, four and one-half, five and one-half, and six and one-half hours thereafter without food and repeated at hourly intervals following a breakfast (carbohydrate 95 gm., protein 96 gm., and fat 27 gm.) in four healthy men and four healthy women (mean age 23.5 yrs.) and seven adolescent girls (mean age 13.5 yrs.). In the adults without food, the glucose values remained near or slightly above the initial fasting level except at one hour when the blood glucose dropped slightly below the initial fasting level. In the adolescents, blood glucose levels showed a continuous decline throughout the experiment, the falls being significantly below the fasting value at two and one-half, three and one-half, and four and one-half hours.

Following the standard breakfast, blood glucose values in the young adults were maintained above the fasting level throughout the six and one-half hour experimental period, whereas in the adolescent girls, blood glucose values, following a brief rise, returned to the initial fasting value in approximately two and one-half hours and then dropped below the fasting level where they remained throughout the rest of the experimental period. No explanation was immediately apparent for this different response in adolescents as compared to young adults either from the present data or from previous similar studies. R.F.B.

Turner, D. S.; and McIntyre, N. (Alexander Simpson Lab., Metab. Unit, St. Mary's Hosp., and Med. Unit, Royal Free Hosp., London, Eng.): STIMULATION BY GLUCAGON OF INSULIN RELEASE FROM RABBIT PANCREAS IN VITRO. *Lancet* 1:351-52, Feb. 12, 1966.

When glucose is infused into the intestine, it induces a greater rate of insulin secretion than when it is infused into a peripheral vein. The liver is not necessary for this effect as the same finding is present in patients with end to side portocaval shunts. Accordingly, it has been postulated that oral glucose ingestion stimulates the release of a hormone from the intestine which in turn stimulates pancreatic insulin release. Since glucagon administration causes insulin secretion and since plasma levels of glucagon rise after oral glucose ingestion, the direct effect of glucagon on pancreatic insulin release was studied. The model used was the in vitro rabbit pancreas. Slices of pancreas were incubated in Krebs bicarbonate buffer, with high or low glucose concentrations and with 0, 0.5 μ g. or 5.0 μ g. of glucagon per milliliter of media. Insulin secretion was estimated by measuring changes in the concentration of immunoreactive insulin. It was found that 5.0 μ g./ml. of glucagon stimulated insulin release at high or low glucose concentrations. Insulin release was stimulated at high glucose levels only by 0.5 μ g. of glucagon. It was concluded that glucagon acts synergistically with glucose to cause insulin release. T.G.S.

Williger, Victor M. (Michael Reese Hosp. and Med. Center, Chicago, Ill.): FETAL OUTCOME IN THE DIABETIC PREGNANCY. *Amer. J. Obstet. Gynec.* 94:57-61, Jan. 1, 1966.

Verbatim Summary: A decade's experience with diabetes in pregnancy, consisting of 115 patients, is detailed. Over-all perinatal mortality was 23.4 per cent. The factors that influence this outcome are discussed. E.A.W.