investigations of other workers. Significantly reduced results in the parents suggest a genetic aetiology for the CF insulinopenia. A factor inhibiting sugar transport has been demonstrated in the plasma in CF children and their parents. The *in vivo* effect of this factor at gut or islet cell level may be responsible for decreased insulin secretion in CF.

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Familial insulin resistant diabetes mellitus.

R. J. West, H. Z. Borin, W. M. L. Turner, and June K. Lloyd. Primary resistance to insulin without ketosis occurs in total lipodystrophy and in lipoatrophic diabetes. This paper reports two sibs with a syndrome comprising hyperinsulinism with insulin resistant hyperglycaemia in association with multiple somatic abnormalities and the development of severe, and ultimately fatal, ketoacidosis in the older, more severely affected child.

Both children had unusual facies, an enlarged and fissured tongue, markedly advanced dentition with dental dysplasia, acanthosis nigricans, thickened nails, and enlarged external genitalia. The elder, a girl, had glycosuria and ketonuria at the age of 5 years. She did not respond to insulin 400 units/day, chlorpropamide, or metformin. Slow deterioration, with episodes of severe ketoacidosis and recurrent infection occurred over the next 2 years. Insulin up to 1000 units/day was again ineffective in controlling hyperglycaemia or ketosis, and she died at 7.8 years. At necropsy the pineal gland was enlarged ($\times 5$) and the ovaries cystic. Her brother, investigated at 3.8 years, had intermittent glycosuria and ketonuria but was not acidotic and had not received exogenous insulin. Fasting serum insulin was very high at 556 $\mu\text{U/ml}$ and rose to 3208 $\mu\text{U/ml}$ after oral glucose; no insulin antibodies were detected. The mother, clinically normal, had abnormally high serum insulin after oral glucose (maximum 300 $\mu\text{U/ml}$).

The relation of the insulin resistant diabetes to the somatic abnormalities is not clear. A few patients who probably have the same disorder are reported on, but such very high endogenous serum insulin levels have not been recorded. Three sibs described by Rabson and Mendenhall (1956) also had hyperplasia of the pineal gland and defective production of a pineal hormone was postulated.

REFERENCE

Rabson, S. M., and Mendenhall, E. N. (1956). Familial hyper trophy of pineal body, hyperplasia of adrenal cortex and diabetes mellitus: report of 3 cases. *American Journal of Clinical Pathology*, 26, 283.

Energy expenditure of obese children: technique for measuring energy expenditure over periods up to 24 hours. J. M. Court (*introduced by June K. Lloyd*). A number of studies suggested that obese children were less physically active than non-obese children. These studies, however, are open to criticism

for a number of reasons: (1) unreliable indices of activity such as the Pedometer have been used; (2) the studies have been carried out on a short-term basis and in abnormal conditions, for example during supervised activities in a summer camp; (3) physical activity may be a poor indicator of energy expenditure, especially in an overweight child who, because of his excess weight, may exert considerably more energy for a given task than a non-obese child.

In the present study heart rate has been used as an index of energy expenditure. For each child, a series of graded exercise tests was first carried out to establish the relation between heart rate and work expenditure. The tests consisted of stair climbing at varying rates, and work expenditure was expressed as the product of the child's weight and the vertical height climbed per unit time. The heart rate was measured using a SAMI (socially acceptable monitoring instrument) heart rate integrator. A linear relation between heart rate and work expenditure was confirmed, and stair climbing tests have proved a practicable technique for studying children of all ages provided they are ambulatory. Average heart rates during periods of up to 24 hours, while the child was carrying out normal activities at home or in hospital, were also measured and extrapolation of the graph expressing relation of heart rate and work expenditure (on the stairs test) allowed assessment of energy expenditure from heart rate measurements made over 24 hours. Preliminary investigations on a small number of obese and non-obese children suggest that some obese children have a substantially lower daily rate of energy expenditure compared with non-obese children. This study may provide evidence to support the suggestion that diminished energy expenditure is a factor in the maintenance or development of some forms of obesity in childhood.

Effects of bile acids on small intestinal absorption of glucose, water, and sodium. J. T. Harries and G. E. Sladen (*Department of Gastroenterology, St. Bartholomew's Hospital, London E.C.1*). Unconjugated dihydroxy bile acids inhibit colonic absorption of water and sodium in several species (e.g. Mekhjian and Phillips, 1970), but no detailed information is available about comparable effects in the small intestine.

In this study, the effects of bile acids on absorption by the rat small intestine were investigated, using an *in vivo* closed-loop technique. Isotonic solutions, containing mainly NaCl and (in jejunum) 20 mM glucose, were placed in loops of jejunum and ileum for short absorption periods. A weighing technique was used to calculate absorption rates.

In the jejunum, deoxycholate (1 mM) impaired absorption of both sodium and water ($p = 0.002$) but not glucose. At higher concentrations (2.5 and 5 mM) secretion of fluid occurred, whereas glucose absorption was only slightly impaired ($p = 0.05$). By contrast in the ileum, 5 mM deoxycholate produced only partial ($p = 0.002$) inhibition of fluid absorption and 10 mM was needed to cause complete inhibition. In both jejunum and ileum, chenodeoxycholate behaved in a

similar fashion, whereas the conjugated taurodeoxycholate (5 mM) had no significant effect. In the jejunum the effect of deoxycholate (1 mM) was shown to be reversible.

Thus, unconjugated dihydroxy bile acids inhibit absorption of water and sodium by the small intestine. The jejunum is more sensitive than the ileum and secretes fluid even when glucose is being absorbed; this dissociation between glucose and fluid absorption suggests that the mucosa is not grossly damaged. These findings may be relevant to the pathophysiological mechanisms responsible for certain types of infantile diarrhoea, since it is known that bacterial overgrowth in the small intestine in association with unconjugated dihydroxy bile acids, may occur in infants with prolonged diarrhoea (Gracey, Burke, and Anderson, 1969).

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- Mekhjian, H. S., and Phillips, S. F. (1970). Perfusion of the canine colon with unconjugated bile acids. Effect on water and electrolyte transport, morphology and bile acid absorption. *Gastroenterology*, 59, 120.

Serum immunoglobulins and food antibodies in suspected coeliac disease. F. Carswell and A. Ferguson. Suction biopsy of the upper intestinal mucosa takes time and is potentially hazardous but is required for the diagnosis of coeliac disease. A simple, safe, and rapid test which indicates the need for biopsy would be of value.

Fifty-two children with suspected coeliac disease were investigated. The serum immunoglobulins were determined by radial immunodiffusion and precipitin tests were used to detect food antibodies in the serum. These tests were used to predict the presence of coeliac disease. All the children subsequently had an upper intestinal biopsy, and of these 30 had coeliac disease as shown by a flattened upper intestinal mucosa and clinical response to a gluten-free diet.

The immunoglobulin levels were not a useful predictor of the presence of coeliac disease whereas the food antibody tests were. The latter tests were more reliable than the whole blood folate or the barium meal and follow-through.

Food antibodies tend to disappear on treatment with a strict gluten-free diet. Such tests performed at the outpatient clinic could therefore be of value in the management of patients with possible coeliac disease.