●1273 PREDICTORS OF IQ AND IQ LOSS IN TREATED PHENYLKETONURIA (PKU). Susan E. Waisbren, Barbara E. Mahon, and Harvey L. Levy, Harvard Medical School, Children's Hospital, Depts. of Neurology and Pediatrics, Boston.

Early-treated children with PKU are protected from mental retardation. However, recent studies have found IQ loss in these children, especially after termination of the low phenylalanine diet. We have studied IQ and IQ change in 91 early-treated children with PKU and 29 untreated or partially treated children with mild hyperphenylalaninemia (MH) who have been followed for up to 22 years. Their most recent psychological evaluations were compared to similar assessments done 5 years previously. In children with PKU, age (10.8 ± 4.7 yrs.) was negatively correlated with IQ (mean IQ = 98.4 ± 16.7) ($r=-.30$, $p=.002$). With age controlled, the treatment variable that best predicted IQ was the percent of blood phenylalanine levels ≥ 16 mg/dl while on diet ($r^2=0.86$). These results suggest that IQ is significantly affected by dietary control during treatment. Over a 5 year period, mean IQ changes were -4.3 ± 14.8 in children with PKU off-diet, +7.4 ± 14.1 in children with PKU on-diet, and +2.8 ± 10.5 in children with MH. IQ change did not correlate with IQ score. With age controlled, the best predictor of IQ loss was diet discontinuation ($r^2=.159$); natural (pre- or post-diet) blood phenylalanine level was the second best predictor ($r^2=.083$). This suggests that loss of IQ is greater in children who have terminated the diet, particularly in those with higher natural blood phenylalanine levels. These findings may have implications for the issue of diet continuation or discontinuation during school age years.

1274 MUSCLE PROTEIN TURNOVER AND GLUTAMINE (GLN) RELEASE IN ACUTE METABOLIC ACIDOSIS (MA). Steven J. Wassner and Jeanne B. Li Penna State Univ Coll of Med. Hershey Med Ctr. Dept. of Ped. Hershey PA

In MA the major nitrogen source for ammoniagenesis is GLN and plasma levels rise within minutes after initiation of MA. GLN may be provided by increased catabolism (C) of muscle at the expense of anabolism and growth. We studied MA in an in vitro perfused muscle preparation obtained from normal, fed rats. The control perfusate consisted of Krebs-Henseleit buffer (NaCl 118 mM, $NaHCO_3$ 25 mM) with erythrocytes, glucose, albumin and amino acids. The MA buffer was identical except that 15 mM $NaHCO_3$ was replaced by NaCl. Both perfusates were continually gassed with 95% O_2/ 5% CO_2. Measured pH values were 7.38 vs 6.99 at the start and 7.33 vs. 7.13 at 3 hours. Protein synthesis (S) and (C) were assessed using [^{14}C] phenylalanine and GLN was determined spectro-photometrically. During the first hour, perfusate GlN rose higher in the MA preparations (0.303 vs. 0.188 mmol/g HC $p = 0.04$), but by 3h, there were no significant differences. Muscle GLN levels decreased between 1 and 3 h (-1.304 vs. -1.125 umol/g HC, p NS) so that net GLN production was no different between the the two groups. Individual S and C rates were not different but MA resulted in a 15% decrease in the rate of net muscle degradation ($P < 0.05$). Thus, MA leads to transient redistribution of GLN between intra and extracellular spaces and to decreased and not increased muscle degradation. These results cast doubt on the importance of muscle as the source of nitrogen for ammoniagenesis in acute MA.

1275 NEW ROLE OF COMPUTERIZED TOMOGRAPHY IN THE ASSESSMENT OF INBORN ERRORS OF METABOLISM. Chester B. Whitley, Deborah Day, Kathyrn L. Pelant, William Krivit. Univ of Minnesota, Departments of Pediatrics & Radiology, Minneapolis

Recent advances in computerized tomography have extended the application of this tool beyond the subjective observation of structural abnormalities. Quantitative capabilities make it the most sensitive method of determining organ volumes and we demonstrate methods to assess liver and spleen size relative to age-specific norms. Measurements are highly reproducible, duplicate studies varying by only 3%, and are therefore useful in following the progression of disease (eg, splenomegaly in Gaucher disease), or in evaluating the effect of treatment. For example, liver volume in a 2-year-old with Hurler syndrome was initially 904 cc (normal range 184-548 cc); subsequent determinations measured progressive reduction in liver size to 453 cc (normal 249-603) at 10 months after bone marrow transplantation. In addition, determination of organ radiodensity can be used to assess metabolic state and provides a noninvasive means of differentiating the accumulation of metal, carbohydrate, and lipid storage materials. This is illustrated by our novel observation, increased hepatic radiodensity in three patients with Hurler syndrome: 78.3, 71.9, and 75.6 HU. Conversely, inborn errors with lipid accumulation are characterized by decreased attenuation value (eg, hepatic radiodensity in Wolman disease of 36.6 HU). Thus, quantitative CT analysis is valuable as a screening tool, for focusing a differential diagnosis prior to biochemical confirmation of inborn errors, and is also a sensitive technique for monitoring pathophysiologic change.

1276 MEDIUM CHAIN ACYL CoA DEHYDROGENASE DEFICIENCY: EVIDENCE FOR AUTOSOMAL RECESSIVE INHERITANCE AND A URINARY MARKER FOR SCREENING. Bruce E. Wilson. Department of Pediatrics, USUHS, Bethesda, MD and WRAMC, Washington, D.C. (Spon. by Gerald W. Fischer)

A 3 1/2 year old white male presented with a history of recurrent severe nonketotic hypoglycemia. Evaluation revealed C6-C10 dicarboxylic aciduria and low serum levels of total carnitine (16.2 n moles/ml), free carnitine (6.2 n moles/ml), and short chain acyl carnitine (5.9 n moles/ml). Urinary carnitine was also low (919 n moles/24hr) but showed markedly increased acyl carnitine to free carnitine ratio (10.9 to 1; normal approx. 0.65 to 1). These findings are indicative of medium chain acyl CoA dehydrogenase deficiency. Family history revealed that a female sibling died at age 10 mos after a sudden collapse during a minor illness. Her autopsy revealed an intraocular glucose of 0 mg/dl (indicating severe hypoglycemia at the time of death) and increased vacuolated fat was observed in the liver and skeletal muscle. These findings are also consistent with medium chain acyl CoA dehydrogenase deficiency. Previous reports in the literation include a pair of fraternal twins with a similar defect in medium chain acyl CoA dehydrogenation and a patient with short chain acyl CoA dehydrogenase deficiency with an elevated urinary acyl carnitine to free carnitine ration of 3.48 to 1. We conclude that, 1) medium chain acyl CoA dehydrogenase deficiency may be inherited as an autosomal recessive; and 2) the urinary acyl carnitine to free carnitine ratio may be a useful non-invasive screen for these conditions.

1277 TYPE I HYPERLIPIDEMIA IN A CAMBODIAN FAMILY. James H. Zavoral, Sherry Muret-Wagstaff, Keijiro Saku, and Moti L. Kashyap. Hennepin County Medical Center, Department of Pediatrics, Minneapolis, and University of Cincinnati, Department of Medicine, Cincinnati.

Four children and both parents were evaluated for hypertriglyceridemia (HTG)when "cream of tomato soup" blood was discovered on a routine screen. The parents, 31 and 36, and the children, ages 3-9, were asymptomatic without history of abdominal pain or xanthomas. Their diet was native Cambodian with American supplementation. They cooked with pork fat, ate ice cream and standard school lunches without symptoms. Three of the children and the father had elevated fasted triglycerides (TG) (2780, 4170, 2930, and 372 mg% - father). The mother's TG was 92 mg%. The HDL-cholesterol (HDL-C) was low in three children with Type I and in the father (12, 13, 12, and 20 mg% - father). The mother's HDL-C was 37 mg%. Utilizing radioimmunoassay, Apo CII was normal in all patients, apo AI was low in the 3 Type I children and in the HTG father. Post heparin hepatic lipase was normal in all patients 7.9-21.3, normals ±2 S.D. 2.5-32.5 μm FFA/ml/hr. Extra hepatic lipase (EHL) was decreased in the 3 Type I children and the HTG father 2.9-9.6, normal ±2 S.D., 11.9-29.9 μm FFA/ml/hr. There was a strong correlation between decreased HDL-C, decreased apo AI, and decreased EHL in this family. Type I hyperlipidemia was discovered in 3 children and decreased EHL in these 3 children and their father who are from Cambodia without xanthomata or symptoms of pancreatitis such as abdominal pain.

MORPHOGENESIS AND MALFORMATIONS

1278 RESPONSE OF PRIMITIVE VEINS OF CHICK EMBRYOS TO EXPERIMENTAL TRANSECTION Stuart Berger, Frank Manasek, Rene A. Arcilla, The University of Chicago Hospitals, Department of Pediatrics and Anatomy, Chicago, Illinois

In a recent microangiographic study of chick embryos at H-H stages 14 to 22, two intracardiac streams were found before/during early septation. The peripheral venous origins of each stream were identified. To determine if abnormal venous return alters intracardiac streaming, a second study was initiated to interrupt the major veins of embryos growing in culture. White Leghorn eggs were incubated at 37-38° C, and embryos were then explanted ventral side up into a culture chamber with Tyrode's solution and kept in incubator at saturation humidity and 1-2% CO_2. They were examined at intervals for stage of development. Two groups were studied: Gp A (H-H stage 10-14, n=6) and Gp B (H-H stage 15-19, n=4). The omphalomesenteric veins in group A and the anterior/posterior vitelline veins in group B were cut with microscissors, and photomicrographs were obtained before and at 5 min, ½, 1, 2 and 3 hours after transection. The cut ends retracted immediately, accompanied by some blood loss. In group A, restoration of venous flow occurred 55 to 195 minutes (m=121) by direct reanastomosis of the cut edges. In group B, venous flow was also restored by 50 to 240 minutes (m=112) but by a different mechanism consisting of anastomosis of the distal end of the cut vitelline vein to an adjoining vein serving as collateral channel. Our observations thus reveal intrinsic capacity of the primitive veins to maintain normal venous return during early embryonic life.