991 LONG CHAIN ACYL-COA DEHYDROGENASE (LCADH) DEFICIENCY (LCD): CLINICAL AND BIOCHEMICAL HETEROGENEITY IN THREE PATIENTS.

Brad A. Amendt, Lisa Teel and William J. Rhead. University of Iowa, College of Medicine, Dept. of Peds., Iowa City, IA

LCD is a disorder of fatty acid ß-oxidation with a wide range of clinical manifestations, including hypoglycemia without ketosis, hypotonia, cardiomegaly and C_6-C_{14} dicarboxylic aciduria. Patient R-1 presented with hypertrophic cardiomyopathy and hypotonia, while siblings H.C. and J.C. had recurrent episodes of hypoglycemia and dicarboxylic aciduria (Hale et. al. Ped. Res. 19:666, 1985; Naylor et. al. JIMD 3:19, 1980). R-1's fibroblasts oxidized [9,10(n)-^{3}H]palmitate at 28% of control levels, while H.C. and J.C. oxidized this substrate much more effectively (49 and 48% of control; $p<0.01$). However, LCADH activity in mitochondrial sonicates was ≤21% of control in all patients; the addition of 20 µM flavin adenine dinucleotide (FAD) increased LCADH activities to 27-36% of control in all three. Monospecific MCADH antisera lowered control LCADH activity 17%, demonstrating that human MCADH dehydrogenates palmityl-CoA. With MCADH antisera, LCADH activities in R-1 and J.C. fell to 11 and 6% of control, respectively. The observed heterogeneity in clinical presentations and fibroblast oxidations were not explained by variations in LCADH activities or FAD responsiveness in these patients. H.C. and J.C. may have either a different mutation in LCADH than R-1, which preserves LCADH activity in vivo, or increased activity of peroxisomal ß-oxidation.

992 URINARY C-PEPTIDE IN NORMAL CHILDREN AND ADOLESCENTS.

Gaya S. Aranoff, John F. Nicholson, and Madeline Gladis. Columbia University, College of Physicians and Surgeons, Babies Hospital, Department of Pediatrics, New York, New York.

C-Peptide is secreted from pancreatic beta cells in equimolar concentrations with insulin. Unlike insulin, C-peptide is largely metabolized by the kidney, with 5%-10% of it excreted in the urine. Timed urine collections for C-peptide reflect prehepatic insulin production. We collected 24h urines in four consecutive six hour aliquots from 32 healthy, ambulatory children (ages 2 to 21 years) on normal diets. C-peptide (by RIA) and creatinine levels were measured on all 6 hour aliqots and on each 24h specimen. Mean C-peptide excretion in micrograms (ug) is listed in the table:

24h	3PM-9PM	9PM-3AM	3AM-9AM	9AM-3PM
28.8±22.3	8.0±6.7	7.8±7.3	6.9±5.8	6.8±6.0
(4-105)	(0.5-30)	(0.5-31)	(0.3-24)	(0.2-24)

Weight was more highly correlated with 24h C-peptide excretion than was age (0.535 vs 0.339), and accounted for 29% of the total variance. When controlled for weight in a multiple regression analysis, age was not a significant predictor. Significant correlation (0.835) existed between C-peptide excretion in the 3AM-9AM and the 24h urines. We conclude that weight can predict C-peptide excretion, which when measured on 1st AM urines can be used to screen for endogenous insulin production.

993 REVERSED CHRONOBIOLOGY OF THE "DAWN PHENOMENON" IN ADRENAL HYPERPLASIA: RESURGENCE OF THE ACTH-ADRENAL AXIS.

Silva A. Arslanian, Philip Starceski, Dorothy J. Becker, Peter A. Lee Univ of Pittsburgh Sch of Med, Children's Hosp of Pgh, Dept of Ped, Pgh, PA.

The "dawn phenomenon" is described in patients with insulin dependent diabetes (IDD) and normal subjects characterized by abrupt increases in plasma glucose (G) levels and/or insulin (I) requirements between 5 and 9 a.m. Suppression of cortisol by metyrapone or ACTH by dexamethasone has failed to abolish the "dawn phenomenon" in IDD so the ACTH-adrenal axis has been felt not to play a role. We have tested this hypothesis in patients with 21-hydroxylase CAH whose ACTH secretion is altered by receiving their usual hs cortisol dosage.

Seven patients, $\bar{m}$ age 20.2 ± 1.7 y, M/F:4/3, $\bar{m}$ hydrocortisone dose 16.7 ± 4.7 mg/m^2/day, were studied. Levels of plasma G, I, cortisol, growth hormone were measured q 20 min, ACTH q h.

	2400 - 0440h	0500 - 0900h
Glucose (mg/dl)	103.2 ± 2.2	92.5 ± 2.7
Insulin (uU/ml)	15.7 ± 2.0	12.2 ± 1.9
Cortisol (ug/dl)	7.6 ± 0.6	8.3 ± 2.5
ACTH (pg/ml)	17.1 ± 6.5	163.2 ± 80.3
GH (ng/ml)	2.6 ± 0.5	2.6 ± 1.5

After 0500h plasma glucose dropped significantly ($p<0.01$) though plasma insulin concentration dropped significantly in all but one, while ACTH levels increased and cortisol dropped then rose. Other hormones were not different before and after 0500h All had normal GTT's. We conclude that a reversed "dawn phenomenon" occurs in treated patients with CAH, suggesting that this phenomenon is an ACTH - cortisol dependent event.

994 CARDIAC MYOSIN ISOENZYME SHIFTS IN NON-INSULIN TREATED SPONTANEOUSLY DIABETIC RATS.

Victor C. Baum, William A. Clark, Dale A. Pelligrino (spon. by Craig B. Langman), University of Chicago, Pritzker School of Medicine, Michael Reese Hospital, Depts. of Anesthesiology and Medicine, Chicago.

Cardiomyopathy is a well-recognized complication of diabetes, with evidence of asymptomatic myocardial involvement in the pediatric population. We evaluated cardiac myosin isoenzymes by native gel electrophoresis in non-insulin treated diabetic BB/W rats, a strain which develops spontaneous euthyroid diabetes and in age-matched insulin-treated diabetic BB/W rats. Seven 3.5-5 month old diabetic rats were successfully maintained without insulin for 19-28 days. The animals were chronically hyperglycemic (blood glucose 436-568 mg/dl) and acidotic (bicarbonate 8.7-27.6 meq/l, mean 16.9; pH 7.06-7.39) despite chronic bicarbonate therapy. Three insulin treated diabetic rats received daily insulin, 3.6 units/kg/day for 13-16 days. Blood glucose was 50-58 mg/dl and bicarbonate 22.7-27.5 meq/l in the insulin treated group. Myosin isoenzymes in 6 of 7 diabetic animals had shifted to essentially all (>90%) V3 isoenzyme. The single animal without a shift was less acidotic and larger than the other untreated animals. Myosin in 2 of the 3 insulin treated animals existed almost entirely (>90%) as the V1 isoenzyme, which is the normal distribution in the rat, and was predominantly V1 in the third animal. Spontaneously diabetic rats develop completed shifts in myosin isoenzymes within 3 weeks of discontinuation of insulin. Insulin treatment of these rats prevents or greatly diminishes this shift. This extends earlier work done in alloxan and streptozotocin induced diabetes and in partially insulin-treated BB/W rats.

995 NORMAL RESPONSE OF FACTOR (F)-VIII AND VON WILLEBRAND FACTOR (VWF) TO DDAVP IN NEPHROGENIC DIABETES INSIPIDUS (NDI).

B Brenner, U Seligsohn, Z Hochberg (Spon. by S.C.Jordan), Depts Hematology, Pharmacology and Pediatrics, Rambam Med Ctr, Rapaport Family Inst, Fac Med, Technion Haifa, and Ichilov Hosp, Tel-Aviv University, Tel-Aviv, Israel.

DDAVP has been described as a stimulator of plasma F-VIII and VWF. The present report describes a study of this response in 4 patients with end-organ resistance to DDAVP, X-linked NDI. DDAVP, 0.3 ugr/kg b.w. was infused IV over 20 min. At 0 time, 1 and 3 hrs urine was measured for osmolality (osm) and plasma for osm, F-VIII and VWF. In one patient this protocol was preceded by a 20 mg/kg water-load, to suppress endogenous vasopressin. Baseline F-VIII and VWF were 144-212 u/dl and 186-362 u/dl resp. in the 3 unsuppressed patients and 104 u/dl and 89 u/dl resp. in the water-loaded patient (normal 63-139 u/dl and 53-177 u/dl resp.). Following DDAVP plasma osm increased slightly, from 300 to 309 mOsm/kg to 305-313 mOsm/kg in the unsuppressed patients, while urine osm remained below 100 mOsm/kg. In the water-loaded patient plasma osm was 281 mOsm/kg. F-VIII increased to 272-760 u/dl and VWF to 213-632 u/dl. This increments were significant ($p < 0.01$) and similar to those observed in normal controls. It is concluded that in patients with NDI F-VIII and VWF are responsive to DDAVP and that end-organ resistance in NDI is confined to the kidneys.

996 EFFECT OF SALMON CALCITONIN IN HYPERCALCEMIA OF IMMOBILIZATION: CALCITONIN SUPPRESSION TEST FOR SERUM CALCIUM (Ca).

Salvador Castells, Kenneth Rebong, Mona Nakajo, Madu Rao, Philip Steiner. SUNY, Health Science Center at Brooklyn, N.Y. Dept. of Pediatrics.

Immobilization hypercalcemia is related to accelerated bone resorption secondary to immobilization. Calcitonin has been shown to be a potent inhibitor of bone resorption in vivo. Hypercalcemia has also been reported in tuberculosis (TB) and sarcoidosis secondary to increased Ca absorption. A 10-yr-old black female was admitted with Potts disease and collapse of her 4th thoracic vertebra. She had complete paralysis of her lower extremities. She was treated with ioniazide, pyrazinamide, rifampin, and streptomycin. The involved vertebra was debrided and her spine stabilized. After two months of complete bed rest her serum CA was 14.5 mg/dl, P 4.5 mg/dl and uric acid 14.0 mg/dl. Hyperuricemia responded to allopurinol. Synthetic salmon calcitonin (Calcimar USV Pharm.) was given at 4 MRC units per Kg subcutaneously. Following calcitonin administration serum Ca in mg/dl was:

Time(hr.)	0	2	4	8	12	16	24	32	48
	14.5	11.6	11.6	10.6	9.6	10.5	10.2	10.8	11.1

The patient was kept on salmon calcitonin at 4 MRC U/Kg/day. Daily serum Ca levels were kept between 9.6 to 11.1 mg/dl. Synthetic salmon calcitonin at 2 to 4 MRC units suppresses bone resorption and lowers serum Ca concentrations in hypercalcemia of immobilization.