EFFECTS OF ANTICONVULSANTS ON CALCIUM METABOLISM IN THE CHICK. M.E. Villareale, W.H. Bergstrom, R.H. Wasserman, R.T. Chiroff and L.V. Gould. State University of New York, Upstate Medical Center, Syracuse, and Cornell University, Ithaca, N.Y.

Hypocalcemia and rickets occasionally complicate chronic therapy with diphenylhydantoin (DPH) and phenobarbital (PB). Inactivation of calciferol (D3) metabolites by drug-induced hepatic enzymes is thought to be responsible. Since PB, DPH, and in particular D3 intakes are variable in human subjects, an animal model is desirable for systematic study of this phenomenon. We have reported hypocalcemia and rickets in chicks given DPH. The present study compared the effects of PB to those of DPH. Cockerels were fed a D3-free diet to which PB was added at concentrations of 1.0 and 2.5 gm per kg. At each PB intake, chicks received 10 or 20 I.U. of D3 orally every three days. Controls got 0, 10, or 20 I.U. of D3 without PB. After 35 days, duodenal Ca_{45} absorption was measured in vivo, and mucosal samples were analyzed for calcium binding protein (CaBP). Serum calcium concentration and the ash/fat-free dry ratio of bone samples were also determined.

Ca_{45} absorption, CaBP, serum Ca, and bone ash/dry ratio all varied in direct proportion to D3 and in inverse proportion to PB ingested. The results paralleled those previously found for DPH. These findings indicate that the chick is a useful model for the study of drug effects on calcium metabolism.

IRON DEFICIENCY ANEMIA AND ABNORMAL URINARY CATECHOLAMINE EXCRETION. Mary L. Voorhess, Marie J. Stuart, James A. Stockman and Frank A. Oski. State University of New York, Upstate Medical Center, Syracuse, New York.

Iron deficiency in infants and children is often accompanied by anorexia, irritability, inattentiveness, and poor school performance. Chronic iron deficiency in rats results in decreased monoamine oxidase (MAO) activity both in vitro and in vivo. Since MAO is an important enzyme in inactivation of catecholamines, evidence for defective catecholamine degradation secondary to MAO inhibition was looked for in 11 children with iron deficiency anemia. Urinary excretion of Dopamine (DA), Norepinephrine (NE), Epinephrine (E), Metanephrine-normetanephrine (MN-NMN) and 3-methoxy-4-hydroxy mandelic acid (VMA) was measured in 24-hour samples before and after treatment with intramuscular iron. Pre-treatment NE excretion was abnormally high. NE excretion decreased significantly ($p < .001$) and returned to normal within one week of therapy, well before hemoglobin levels had increased substantially. VMA excretion was also higher pre than post-treatment ($p < .05$). There was no difference between pre and post-treatment levels of DA, E, and MN-NMN. These variations in catecholamine pathways may be responsible for the behavioral changes observed in iron deficiency and provide the first biochemical link between iron deficiency and its multiple symptoms.

PANCREATIC ISLET ALPHA AND BETA CELL RESPONSES TO ORAL AND IV ALANINE IN APPROPRIATE FOR GESTATIONAL AGE (AGA) AND SMALL FOR GESTATIONAL AGE (SGA) INFANTS. P.R. Williams, R.H. Fiser, Jr., P.V. DeLamater, M.A. Sperling, D.A. Fisher, and W. Oh. UCLA Sch. of Med., Harbor Gen. Hosp., Dept. of Ped., Torrance, Ca.

The decline in blood glucose (G) level during the immediate neonatal period has been attributed partly to sluggish glucagon (GN) release and relative deficiency in gluconeogenesis. This hypothesis was tested by measuring plasma G, GN, and insulin (I) response to oral feeding of 0.5 gm/kg of L-alanine in 40 AGA term, 10 AGA preterm and 16 SGA infants, age 1-4 days. Universally noted was an increase in G levels when baseline G levels were <60 mg% [baseline G 47.5 ± 2.0 mg% vs. 52.0 ± 3.0 (30 min.) and 56.6 ± 3.3 (60 min.), M ± SEM, $p < .02$]. No significant G changes were noted in infants with G >60 mg%. This was not related to gestational age, postnatal age, AGA or SGA. AGA term infants had a significant increase in I (6.4 ± 0.7 to 10.9 ± 1.7 μU/ml, M ± SEM, $p < .05$), at 1 hr. and GN at 1/2, 1, and 4 hrs. (300%, 228%, and 28% above baseline respectively, $p < .05$). Similar G changes were noted in 6 AGA preterm and 13 SGA infants receiving IV alanine 1 mM/kg. In six 1-day old infants, blood G was increased to 117 ± 35 mg% by steady state G infusion. At this G level, oral alanine did not elicit a rise in G, GN, or I.

These data indicate that alanine can evoke a rise in G in preterm, term, AGA or SGA infants when the baseline blood G is <60 mg%; this is probably due to GN stimulating glycogenolysis and/or gluconeogenesis.

MORPHOGENESIS

APPARENT CUTIS LAXA, MICROCEPHALY, CHD, POLYCYSTIC KIDNEYS, HYPOGENITALISM - A "NEW" SYNDROME. Edward T. Bersu, James C. Pettersen, Enid F. Gilbert and Chirane Viseskul. (Intr. by John M. Opitz). University of Wisconsin Center for Health Sciences and Medical School, Depts. of Anat., Path., and Med. Genetics, Madison, WI 53706.

A complete dissection was done on a 7 day, 46 XY infant with mild IUGR and a syndrome of microcephaly, fleeting forehead, high bridge of nose, mongoloid slanting of palpebral fissures, micrognathia, congenital heart disease, hypoplastic external genitalia with penile hypospadias, foot deformities and remarkable redundancy of skin, especially over "nape of neck" and extremities.

Anatomical and histological studies showed an apparent absence of elastic fibers in skin, heart defects (absence of superior vena cava, left superior vena cava entering an enlarged coronary sinus, large ASD, triple coronary arteries, PDA, bicuspid pulmonic valve), hypoplastic inguinal testes, and bilateral Potter Type II dysplastic, polycystic kidneys. These findings are interpreted as a (genetic?) multiple congenital anomaly syndrome with apparent mosaic pleiotropy rather than as a connective tissue dysplasia with relational pleiotropy. Skin findings may reflect fetal lymphedema; in a similar patient (Kaye, et. al., 1974 Am. J. Dis. Child. 127:115) pitting edema of feet was seen. This condition may represent a new syndrome.

FATAL FAMILIAL FETAL HYPERKERATOSIS. BRYAN D. HALL (INTR. BY M. GRUMBACH). UNIVERSITY OF CALIFORNIA, MOFFITT HOSPITAL, DEPT. OF PEDIATRICS, SAN FRANCISCO.

Three male siblings dying within the first twenty-four hours of life suffered from hyperkeratosis, digital bands, knee and elbow flexion, thrombocytopenia, progressive anemia, heart block, cardiomegaly, hepatomegaly, and hypoglycemia. The hyperkeratosis spared only the craniofacial area and caused thick, slightly cracking skin over the rest of the body. Symmetrical hyperkeratotic bands constricted each finger and toe at the mid-point of the first and second phalanx causing swollen digital tips. The non-specific anemia required transfusions in two of the children while the thrombocytopenia was responsible for an intraventricular hemorrhage in one child. First and second degree heart block was present in each child. Death occurred after prolonged apnea and bradycardia in each case. Post-mortem findings showed very abnormal livers with fibrosis, disarray of liver cords, and hemorrhage. Although some of the children's features can be found in the harlequin fetus, the differences are sufficient enough to suggest that the three boys represent a newly recognized inherited syndrome.

A SYNDROME OF ECTRODACTYLY, ECTODERMAL DYSPLASIA, CLEFT LIP AND PALATE, PARTIAL ANODONTIA AND UROGENITAL ABNORMALITIES. Ghassan Hatahet, Michael A. Ernest, Robert L. Kaufman, and Peter A. Pullon, (Intr. by Philip R. Dodge). Washington U. Sch. of Med., and Dentistry, St. Louis Children's Hosp., Depts. of Ped. and Med., St. Louis, Mo.

Three of four siblings born to nonconsanguineous unaffected parents had various manifestations of a multiple malformation syndrome. All three had hypohidrotic ectodermal dysplasia and partial anodontia. A 20 year old white woman had cleft lip and palate, ectrodactyly and syndactyly of the hands and mild to moderate conductive hearing loss. A 13 year old boy had cleft lip and palate, syndactyly, moderate hearing loss and an ilial bladder. He had had a hydrocele and urethral obstruction. A 12 year old girl had absence of the labia minora. Absence of the right kidney and ureterovesical obstruction on the left were detected roentgenographically. The obstruction was corrected surgically. The disorder in this family is similar to that described previously by Rosselli and Gulienetti and by Bowen and Armstrong. It would appear to be of autosomal recessive inheritance.