BLOOD GROUP CHIMERA-PROBABLY A RESULT OF DISPERMATIC FERTILIZATION OF OVUM AND ITS UNEXTRUDED FIRST POLAR BODY: Ashok Shende and Philip Lanzkowsky, Dept. of Ped., Long Island Jewish-Hillside Med. Ctr., New Hyde Park, New York, and Sch. of Med., Health Sciences Ctr., State Univ. of N.Y. at Stony Brook.

A unique, previously undescribed type of blood group chimera was found in a female singleton child, karyotype 46/XX. The following data were obtained:

Subject	Phenotype	Relevant Genotype	Subject	Phenotype	Relevant Genotype
Mother	A_1,ccDEe,MNSs, Kk,Fy(a-)Fy(b+), Jk(a+)Jk(b+), Xg(a+).	R^2r, Kk, Xg^aXg.	Father	A_1,ccddee,MNSs, Kk,Fy(a-)Fy(b+), Jk(a+)Jk(b+), Xg(a-).	rr, Kk, Xg.
Patient	A_1, Ns, D(+)20%, D(-)80%, E(+)10%, E(-)90%, k(+)20%, k(-)80%, Fy(a-) Fy(b+), Jk(a-) Jk(b+), Xg(a+)20%, Xg(a-)80%.	rr80%, R^2r20%, KK80%, Kk20%, XgXg80%, Xg^aXg20%.	Brother	A_1,ccddee,MS, kk,Fy(a-)Fy(b+), Jk(a-)Jk(b+), Xg(a-).	rr, kk, Xg.

The most likely explanation is fertilization of secondary oocyte and its unextruded 1st polar body by two sperms each containing X chromosome. This resulted in a major population of cells rr, KK, XgXg genotypes derived from fertilization of secondary oocyte, and a minor population possessing R^2r, Kk, Xg^aXg genotypes derived from fertilization of 1st polar body.

MUSCLE PATHOLOGY IN LEIGH'S DISEASE, Jerry L. Simmons and Richard J. Allen, Univ. of Mich., Mott Children's Hosp., Depts. of Pathology and Pediatrics, Ann Arbor.

Leigh's Encephalopathy (SNE) is still an incompletely defined CNS disorder affecting children. Recent studies of muscle in two male children, ages 7 months and 4 years (at the onset) revealed previously undescribed histological and histochemical changes. There were two distinctly separate populations of muscle fibers, large polygonal type I fibers and and small polygonal type I and II. Each type I large fiber was surrounded by several small type I and II fibers in an orderly pattern throughout all of the muscle fascicles. There were rare large type II fibers. The histological changes were identical in both infants.

The youngest infant died at nine months as did a sibling two years previously following a similar course of degeneration. Muscle was obtained at autopsy from the left pectoralis major. The second child developed progressive neurological deterioration at four years and is still alive. Muscle was obtained by biopsy of the left deltoid.

During life both patients and parents showed urinary inhibition of TPP while brain tissue analysis (patient no. 1) for thiamine and thiamine triphosphate (J. Murphy, Pittsburgh) was reduced as reported in SNE. Studies also showed progressive EEG deterioration, mild biochemical derangements in alanine-pyruvate-lactate levels and normal CSF protein.

These studies of muscle suggest another component to SNE and a possible method of diagnostic confirmation.

EFFECT OF CHROMOSOMAL ABNORMALITIES ON G6PD ACTIVITY IN CULTURED HUMAN FIBROBLASTS. Mark W. Steele and K. Elaine Owens, Univ. of Pittsburgh Sch. of Med. and Children's Hosp., Pittsburgh.

Previously we reported a sex difference in activity of X-linked G6PD in cultured antenatal lung as a consequence of depression of G6PD activity in the male rather than lack of X-inactivation in the female. Shortly after birth male G6PD activity rises to equal that of female. G6PD activity in cultured skin is lower than that of lung and does not show developmental or sex differences. The lability of the effective output of the G6PD locus in cultured lung compared to skin is again demonstrated in the present report on: LUNG-two strains each 47,XX,21+;one each 46,XX,t21/21;45,XX,22-;47,XX,18+;47,XXY;49, XXXXY;and SKIN-one strain each 47,XX,21+;47,XY,9+;47,XXY;49, XXXXY. Compared to chromosomally normal controls, G6PD activity was depressed ∿53%($p<0.001$) in all five lung strains with autosomal aneuploidy. G6PD activity was the same as 46,XX controls in Y bearing multi X lung strains;and was unaffected in skin strains with either X or autosomal aneuploidy. LDH activity was unaffected in all chromosomally abnormal strains. The diversity of the autosomal aneuploidy suggests that its effect on G6PD activity in lung reflects upon a general rather than a specific type of interference with regulation of the effective output of the G6PD locus. That antenatal Y bearing multi X lung has the same G6PD activity as 46,XX lung suggests that depression of G6PD activity in antenatal 46,XY lung is related to the presence of a single (as opposed to multiple) X chromosome rather than to some effect of the Y chromosome.

A BIOCHEMICAL MARKER IN A DOMINANT MOUSE TRAIT. H. Tenenhouse, R.J.M. Gold, Z. Kachra & F.C. Fraser. MRC Genetics Group, Montreal Children's Hospital & McGill University, Montreal, Canada.

Mice, heterozygous (Nn) for the Naked (N) trait, show patchy depilation, as a result of excessive breakage of the hair shafts. Hair from four Nn and from four normal mice belonging to the same strain, inbred for 57 generations with forced heterozygosis, was subjected to hydrolysis and amino acid analysis in triplicate. The mutant hair contained 20% less glycine and 27% less tyrosine than normal hair ($p<0.001$) as shown in the table, where the results are expressed in moles per cent.

	CONTROL				NAKED			
Animal	1	2	3	4	5	6	7	8
Tyr.	4.4	4.6	4.7	5.0	3.0	3.1	3.4	3.4
Gly.	10.3	10.5	10.5	10.7	8.1	8.5	8.5	8.5

Whole hair was next extracted by reduction and alkylation. The Nn proteins thus extracted contained 30% less glycine and 40% less tyrosine than the normal proteins. These results suggest that Nn hair is deficient in the high glycine, high tyrosine protein fraction which is extracted by the procedures used and which comprises about 25% of the total protein in mouse hair. This mutation provides a rare biochemical marker in a dominantly inherited malformation.

A BEHAVIORAL STUDY IN RATS TREATED WITH AN EXPERIMENTAL DIET FOR HOMOCYSTINURIA. Timothy O.T. Ts'o and Paul W.K. Wong. The Dow Chemical Co. Midland, Mich. and Abraham Lincoln Sch. Med., Univ., Illinois, Chicago, Ill.

Patients with cystathionine (cy) synthase deficiency are unable to synthesize cy from homocysteine and serine. Wong et al. showed that they could form cy from homoserine and cyst(e)ine, and thus might correct cy deficiency. The effect of diets containing Jack Bean (JB) (with 2% homoserine) on Spraque-Dawley rats from weaning was tested in groups of 30 each as follows: A, Purina Chow, B, 44.5% corn + soya (so), C, 44.5% JB + so, D, 44.5% heated JB + so, E, 30% heated JB + so, F, 65.8% + so, G, 88.7% JB. All diets contained salts, vitamin, 1.3% cystine and 5% corn oil. G showed inanition but there was no significant difference in the mortality of other groups. From 101 to 111 days, all rats were tested by a novel computer-controlled behavioral system which required them to lever-press for standardized food pellets. Statistical analysis showed that C and F pressed for significantly more pellets that A. C, D and E pressed for significantly more pellets than B. 26% A, 70% C and 30% F "learned" to lever-press within 30 min (A vs C, $p<0.001$). C could "recall" significantly faster than B. Heating of JB (to destroy urease) did not produce any significant difference. This demonstrated a rapid, quantitative and reliable technique in evaluating "learning", "recall" and "motivation" in toxicologic or behavioral studies, and revealed the superior performance in some groups of rats fed JB containing diets.

THE ENZYMATIC DEFECT IN TYPE II HYPERPROLINEMIA: ABSENCE OF Δ^1-PYRROLINE-5-CARBOXYLIC ACID DEHYDROGENASE ACTIVITY. David Valle, James M. Phang and Stephan I. Goodman, (Intr. by Paul di Sant' Agnese), NIH, Bethesda, and Dept. of Ped., Univ. of Colorado Medical School, Denver.

Type II hyperprolinemia is characterized by hyperprolinemia, iminoglycinuria and urinary excretion of o-aminobenzaldehyde (OAB) reactive material, presumably Δ^1-pyrroline-5-carboxylic acid (PCA). We now report the first demonstration of the enzymatic defect responsible for this syndrome. The patient is an eleven year old female with 15x elevated plasma proline values, iminoglycinuria, and OAB reactive material in her urine. We compared the enzymes of proline metabolism in the fibroblasts of the patient with those in 3 normal fibroblast lines. All cells were grown in Eagles' MEM. PCA dehydrogenase was measured by recovering product glutamate-^{14}C formed from precursor PCA-^{14}C (7.2×10^{-6}M). The reaction mixture also included NAD (3.7×10^{-4}M) and 10-50 µgrams of fibroblast protein. Sonicates of the patient's fibroblasts had no detectable PCA dehydrogenase activity while sonicates from control fibroblast lines produced 34 ± 2 n moles/hour/mg protein. This value represents a 10x increase over the reaction blank. The activities of ornithine-δ-transaminase and PCA reductase were normal in sonicates of the patient's cells. These results demonstrate that the enzymatic defect in Type II hyperprolinemia is an absent or defective PCA dehydrogenase. This block in the proline catabolic pathway results in accumulation of PCA which is excreted or converted to proline by PCA reductase.