"positive" clones and controls. The α-galactosidase from uncloned fibroblasts of a heterozygote shows a rate of inactivation indicative of a mixture of 2 enzymes. Moreover a small reproducible difference in the apparent K_m value between the wild-type and the mutant enzyme from one patient adds evidence for the structural character of this mutation. The specific activity of both mutant and wild-type α-galactosidase increases 10 and 4 times respectively, if the fibroblasts are maintained in a stationary phase of growth, while the activity of β-galactosidase increases fivefold in normal and α-galactosidase deficient cells. This has made possible electrophoretic analysis of the mutant α-galactosidase which, in the one family examined, does not migrate differently from the wild-type enzyme on Cellogel at pH 5.0.

Demonstration of a defect in the matrix fraction of keratin in Clouston's ectodermal dysplasia. R. J. M. GOLD and C. SCRIVER. *McGill Univ.-Montreal Children's Hosp. Res. Inst., Montreal, Que. Canada.*

Clouston's hydrotic ectodermal dyplasia is caused by a single dose of an autosomal gene whose effects are confined to the skin and its appendages. ED hair contains more tyrosine and phenylalanine and less serine and proline than normal hair, suggesting a defect in the matrix protein. Further investigation of this protein has confirmed this hypothesis. Electrophoresis of the S-carboxymethyl derivative of the matrix protein (SCMK-B) on starch gel at pH 2.4 generates an abnormal pattern of bands. Moving boundary electrophoresis yields an abnormal peak not present in this protein fraction from normal hair, and sedimentation velocity studies at 360,000 x g show an abnormally high proportion of low molecular weight protein. Hydrolytic cystine yields suggest, and polarography confirms, that the disulphide content in ED hair is abnormally low. This corresponds with an abnormally low-S-carboxymethyl cysteine yield when the fibrillar fraction (SCMK-A) is hydrolysed. The physical and chemical properties of the mutant hair can be explained by these findings which also give considerable insight into the structure of normal keratin.

Genetic heterogeneity in acid phosphatase deficiency. HENRY L. NADLER. *Northwestern Univ. Med Sch., Children's Memorial Hosp., Chicago, Ill.*

Lysosomal Acid Phosphatase Deficiency (LAPD) is characterized by vomiting, lethargy, opisthotonus, terminal bleeding and death in early infancy (Nadler & Egan, NEJM: *282:* 302, 1970). Acid phosphatase (AcP) activity in fibroblast from patients with this disorder is decreased to 30% of normal in original homogenates (OH) and to less than 2% in the lysosomal fraction (Lys). Recently we have observed a patient with similar clinical manifestations but who expired at 36 hours of age. AcP in his fibroblasts was reduced to 2% of normal in OH and was not detectable in Lys. Therefore, this was considered to represent a total acid phosphatase deficiency (TAPD).

In comparing the AcP activities of the two patients with normal, several differences were noted. Addition of 1 ug/ml of prednisolone to these cultures induced AcP to 50% of normal in LAPD cells but had no effect on TAPD cells. This induction was inhibited by actinomycin D, puromycin and chloramphenicol. After mixing and hybridization of LAPD and TAPD cells an increase in AcP activity up to 50% of normal could be observed in OH and Lys after one week. Addition of prednisolone could not induce any further AcP activity in the mixed or hybrid cultures.

These studies clearly indicate genetic heterogeneity for acid phosphatase deficiency. The stimulation of AcP activity by prednisolone suggests that the basic defect in LAPD is an altered regulatory mechanism in contrast to that of a structural gene defect in TAPD. The potential usefulness of prednisolone therapy in patients with LAPD is suggested.

Electron microscopy of uncultured amniotic fluid cells: *In utero* diagnosis of type II glycogenosis. GEORGE HUG, WILLIAM K. SCHUBERT, and SHIRLEY SOUKUP. *The Children's Hosp. Res. Found., Cincinnati, Ohio.*

Electron microscopy (EM) of uncultured amniotic fluid cells has been performed on 14 specimens. Of these, 10 specimens served as "normal controls" while the other 4 were from women who had previous babies with type II glycogenosis (type II GSD). EM of "normal controls" indicated the presence of two cell types: (1) frequent squamous epithelial cells with varying amounts of *cytoplasmic* glycogen but without membrane bounded accumulations of glycogen (i.e., without *lysosomal* glycogen); and (2) rare ciliated cells that may derive from the fetal trachea. Of the 4 high risk pregnancies, two had amniotic fluid cells indistinguishable from "normal controls" and produced clinically and biochemically healthy children. Amniotic fluid cells of the remaining two pregnancies contained glycogen accumulations surrounded by membranes (lysosomal glycogen) that are the hallmark of type II GSD. Upon termination of one of these pregnancies at 21 weeks of gestation, the fetus had type II GSD by biochemical and EM criteria. The other pregnancy resulted in the delivery at term of a boy who apparently was healthy clinically but who at birth had the abnormal lysosomes in skin, liver and muscle and who died of type II GSD at age 4 months. Eight obligatory heterozygotes for type II GSD did not have abnormal lysosomes in hepatic biopsy specimens. We conclude that direct EM of uncultured amniotic fluid cells may help with the in utero diagnosis of type II GSD. A major advantage of this method is diagnosis within three days of amniocentesis.

Evidence for dominant transmission of chronic granulomatous disease from leukocyte oxygen uptake studies. STELLA B. KONTRAS, JOANN G. BODENBENDER, GRAIG B. LIDEN, and SOMASUNDARAM ADDANKI. *Ohio State Univ., Coll. of Med., Children's Hosp., Columbus, Ohio.*

Chronic granulomatous disease (CGD), an X-linked disorder of males, may also occur as an autosomal trait. Detection of the heterozygote by nitroblue tetrazolium dye tests (NBT) and bactericidal studies has not been successful in these families. Leukocytes of patients with CGD fail to show normal increments in respiration (O_2 consumption) during phagocytosis of latex particles. A GME Oxygraph Model KM (Gilson) was used to determine phagocytic and basal rates of leukocyte O_2 uptake in picomoles O_2/min/million cells. A ratio of phagocytic to basal rate (P/B) for leukocytes from a series of normal males, females and children has been reported previously. Two families with clinical CGD non X-linked were studied by NBT dye tests, bactericidal studies and O_2 consumption. In one family, 3 girls were affected; the father and brother were not affected and had normal studies but the mother had intermediate bactericidal capacity in one of 3 determinations. She had consistently abnormal O_2 uptake (P/B of 2) as compared to normal females who show P/B of 13.3 ± 2.4. In the other family, a male propositus had typical clinical and lab findings of CGD. A male sib and both parents were normal clinically and by usual lab tests, however, the

father's cells showed decreased O_2 uptake below the average for normal males (P/B of 9 compared to normals of 11.83 ± 1.94).

It is suggested from these studies that leukocyte O_2 uptake may be of value in detecting asymptomatic carriers of CGD for more precise genetic counseling.

α-1,4 Glucosidase activity in Pompe's disease. IRA S. SALAFSKY and HENRY L. NADLER. *Northwestern Univ. Med. Sch., Children's Mem. Hosp., Chicago, Ill.*

α-1,4 Glucosidase (α-glu) has been shown to be absent in cultivated amniotic fluid cells (AFC), fibroblasts (FIB) and liver (LIV) of patients with Pompe's disease. In contrast, α-glu is present in the kidney (KID) and amniotic fluid (AF) of these patients. In an attempt to explain these differences, properties of α-glu including pH optima, turanose inhibition and heat inactivation were studied in controls (C) and Pompe's (P). The results are as follows:

	Specific Activity*		pH Optima		Turanose Inhibition†		Heat Inactivation‡	
	C	P	C	P	C	P	C	P
AF	5.4	14	6.0	6.0	47	51	7	8
AFC	5.1	0	4.0	—	92	—	100	—
FIB	5.9	0	4.0	—	90	—	100	—
LIV	9.3	0	4.0	—	94	—	100	—
KID	10.3	7.5	6.0	6.0	33	53	100	100

* umoles maltose hydrolyzed/min/gm protein.

† % inhibition by 0.03 M turanose.

‡ % activity remaining after heating at 45°C for 15 minutes.

No α-glu activity could be demonstrated in urine or maternal serum. α-glu in amnion had properties identical with FIB and LIV enzyme. Upon differential centrifugation of the cell-free amniotic fluid, cells and tissues, α-glu was found primarily in the 25,000 × g fraction. These data clearly indicate that the α-glu present in AFC, FIB and LIV have identical properties which are distinctly different from the α-glu in AF and KID. The α-glu in AF differs from that found in KID in its greater heat lability. These studies fail to identify the origin of the α-glu in amniotic fluid. The diagnosis of Pompe's disease *in utero* must rest on the demonstration of the α-glu deficiency in amniotic fluid cells.

Testicular feminization: Expression in sex skin fibroblast culture. LEONARD PINSKY, SHREE MULAY, ROSANNA WEKSBERG, and SAMUEL SOLOMON. *Lady Davis Institute, Jewish General Hosp., Royal Victoria Hosp., McGill Univ., Montreal, Que., Canada* (Intr. by Charles R. Scriver).

The inheritance and pathogenesis of human testicular feminization (TF) are unknown. The possibilities of X-linked recessive inheritance and primary target organ refractoriness to testosterone (T) could be studied optimally in serially subcultured cell strains. Fibroblasts derived from sex and non-sex skin of males, females and patients with TF were incubated with T-4-^{14}C. T and its metabolites in the culture medium were separated by paper chromatography and identified by reverse isotopic dilution. The rate of T metabolism was much greater in sex than in non-sex strains. For both newborn foreskin and adult labial strains, androstenedione was the primary metabolite to T, however they differed in their rate of production of 5α-androstanedione and andosterone. In a strain derived from the foreskin of a 7-year-old, 5α-androstanedione, rather than andraostenedione, appeared to be the major early metabolite. 5α-dihydro-testosterone (DHT) was a major metabolite in none of the strains. Sex and non-sex strains from two patients with TF were indistinguishable: Both had low rates of T metabolism. We conclude that: 1) *in situ* differences in T metabolism between normal sex and non-sex skin persist in their serially subcultured fibroblasts; 2) an expression of the TF gene is detectable in sex skin fibroblasts without reference to the rate of DHT formation; and 3) Lyonization of cloned heterozygous fibroblasts may prove that human TF is X-linked.

Evidence linking an extra Y chromosome to sociopathic behavior. LYTT I. GARDNER and RICHARD L. NEU. *State Univ. of New York Upstate Med. Ctr., Syracuse, N. Y.*

There is accumulating evidence that certain XYY males are more prone to sociopathic behavior than are XY males, and that the extra Y chromosome may be causally related to this behavior. Eleven studies were surveyed which the percentage of XYY were identified among selected male populations in prisons and mental hospitals. The men were selected for height (over 59 in.), having dangerous or violent propensities, or for being mentally subnormal. These percentages were contrasted with the findings of XYY males in several surveys of newborn populations. There was found a strikingly higher incidence (1.8 to 12.0 per cent) of XYY males in institutions than in the general populations as determined from newborn surveys (0.14 to 0.38 per cent). It could appear that only a small fraction of the total numbers of XYY males known to exist in the population are institutionalized sociopaths. The XYY sociopaths represent a numerically small subdivision of the large group of mostly normal XYY individuals (there is some indication that a nosologic classification is developing, since XYY males with abnormal genitalia appear to represent a discrete subgroup.). The implications of these data are obvious in the counselling of parents of XYY children. It is especially important that the physician allay the fears created in parents by the numerous popular articles linking the XYY karytotype to criminality through a careful presentation of the data thus far at hand.

Perinatal expression of the Lewis and secretor blood group systems. MINERVA B. ARCILLA and PHILLIP STURGEON. *U. C. L. A. Sch. of Med., Los Angeles, Calif.*

Studies on expression at birth and on maturation of the secretor and Lewis blood group systems, as manifest on red cells and in saliva, have been carried out on a series of infants using three Lewis reagents: anti-Le^a, -Le^b and -Le^x.

Among adults, 20% are Lewis red cell type Le(a+b−x+) and 70% are Le(a−b+x+); both types are essentially absent at birth. A third type Le(a−b−x−) is found in both 10% of adults and in 10% of infants; 90% of newborn infants, however, have the unique type Le(a−b−x+). Infants of the latter type undergo a rapid maturation during the first week of life to the adult Le(a+b−x+) type. Then, if they are salivary *non secretors* of ABH, they remain that type throughout life. Whereas those who are *secretors* evolve during the ensuing four months to Le(a+b+x+) which is also a type practically unique to infancy; finally, by two years of age, they evolve to the most common adult type, Le(a−b+x+).

Salivary phenotypic expression of the genes involved in the above red cell types is found in soluble form but the state of development at birth is more advanced than on the red cell and the subsequent maturation is more rapid. Prematures show a relatively delayed maturation in the expression of these genes. Thus, unlike other blood group systems, the Lewis system is unique in infancy; it shows differential tissue expressivity and,