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Investigation is being conducted of the effect of urban blood lead levels on the activity of glucose-6-phosphate dehydrogenase (G6PD) in the red cells (rbc) of enzyme deficient negroes. Blood lead was determined in 202 students, age 6 to 17, suggested as deficient by initial mass screening with two or three serial assays including G6PD, 6 PGD, red cell indices and reticulocytes plus sampling for GSH reductase, ATPase, ALA dehydratase, and haptoglobins. Significant findings include: (1) G6PD deficient (0-4 μM) negroes had a significantly higher concentration of lead in both rbc and whole blood when corrected for anemia, as compared with nondeficient individuals of comparable age, sex, socioeconomic score, and census tract. This is the first demonstration of a genetic susceptibility to an air pollutant. (2) Whole blood lead, corrected for anemia is preferred to red cell lead since intracellular accumulation of lead progresses rapidly in vitro. (3) Evidence of the direct effect of ambient lead on blood lead is derived from the significantly higher blood lead in elementary school children in central Omaha which has industrial as well as automobile sources of lead emission than in comparable students just three miles away; seasonal correlation with air lead levels at the sites is expected to be available.

A regional system for transport of sick neonates in Arizona. H. B. P. MEYER, L. WAGNER, and W. J. DORSON (Intr. by V. A. Fulginiti). *Good Samaritan and St. Joseph's Hosps. and Arizona State Health Dept., Phoenix; and Engineering Ctr., Arizona State Univ., Tempe, Ariz.*

In 1967, newborn intensive care centers were developed within two community hospitals having a combined delivery rate >8000 births/year. Two hundred twelve neonates were transported from rural hospitals to these centers between July, 1967 and June, 1970 by specially trained nurses from the centers under direction of a neonatologist. Characteristics of the infants, distance travelled and morbidity and mortality were compared according to a modification of Lubchenko's method. Mortality associated with IRDS was compared between infants transported from and infants remaining in hospitals of birth.

85% of transported infants had birth weights <2500 g. Observed morbidity (86%) and mortality (28%) exceeded predicted morbidity (65%) and mortality (23%) in these infants. Predicted mortality was the same in transported infants with IRDS remaining in their hospitals of birth (59%) exceeded mortality in transported infants with IRDS (32%). Infants originating within or beyond a 60-mile radius of the center had identical mortality (28%).

This transport system has made necessary care available to sick neonates born outside newborn intensive care centers with minimal compromise resulting from transport. Mortality has been independent of distance travelled.

What happened to I.Q. between four year and seven year in a selected collaborative project population. ROSALIND Y. TING, THOMAS F. MCNAIR SCOTT, THOMAS E. ATKINS, and DONALD GOLDSTEIN. *Univ. of Pennsylvania, Children's Hosp. of Philadelphia.*

One hundred eighty-one of 2341 4-year-olds had I.Q. below 70 (7.7%). 133 of 181 had I.Q. between 60 and 69 (73.5%). Of these 133, 94 Negro children were studied, on whom there was complete information available for analysis on maternal socio-environmental, prenatal history, pregnancy, labor, and delivery

records; examinations at birth, 4 months, 8 months; 1, 3, and 4 years. As controls, 94 Negro children matched as to birthdate and sex were used with an I.Q. above 90 on the 4 year examination.

The study children showed a higher incidence of low birth weight, delay in motor development at 1 year and delayed speech development at 3 years.

The mothers of these children had the following characteristics namely: a higher incidence of teenage pregnancy, low education, large family size, closer sibship and a low socio-economic index.

At 7 years of age of the 87 available children 6 (6.9%) still had an I.Q. below 70. 43 (50%) showed a gain to the 80-109 level, 34 (39%) showed a rise to the 70-79 level. Of the 74 available controls 13 (17.5%) dropped to 80-89 I.Q. level and 2 (2.7%) to the 70-79 level, while the remainder showed minimal changes in I.Q. points within the normal range. A further analysis of preschool and school activities, the I.Q. of siblings and the changes in socio-environment suggest that the availability of stimuli outside the home had contributed to the development to their genetic potential of the children in whom there was a significant increase in I.Q. points.

The predictiveness of infant developmental diagnosis. HILDA KNOBLOCH and BENJAMIN PASAMANICK. *Albany Med. Coll. and N. Y. State Dept. of Mental Hygiene, Albany, N. Y.*

The purposes of infant evaluation are to detect the child with organic disease of the brain and to identify factors which will modify the course of development. Follow-up of 199 infants seen between 16 and 52 weeks and re-evaluated at an average age of 7 years indicates the infant evaluation is highly predictive and points out some of the most important factors which affect school-age behavior. This report is confined to DQ (general developmental quotient)-IQ (Stanford-Binet) changes.

Infant neuromotor status and developmental quotient form the basic substrate, which is modified later by socioeconomic status and the occurrence of seizures after the infant examination.

Of the 30 non-defective infants who fell to IQ 75 or less at school age, only one was not explainable by associated adverse factors, singly or in combination: i.e., abnormal infant neuromotor status, subsequent seizures, lowest third in the socioeconomic scale or other specific diseases such as Down's or cretinism. In contrast, if the child is in the highest socioeconomic third his school-age function is good, even if adverse factors are present. Only 5 of the 48 children with IQs 106+ would not have been expected to achieve this level on the basis of their infant behavior; only one of these was in the lowest socioeconomic third.

Perceptual-motor, language, school achievement and central nervous system integrative functions, as measured by a battery of tests at school age, were predicted at the same high level by the infant examination. The data indicate the importance of clinical judgment in diagnostic evaluation in infancy.

Patterns of illicit drug use among patients in an adolescent medical service. MARION N. CHALL. *Teenage Service, Beth Israel Med. Ctr., New York, N. Y.* (Intr. by Saul Blatman).

The objective of this work is to describe the prevalence of various types of illicit drug use among adolescents treated in a comprehensive ambulatory medical service, located in a lower-middle and low-income area of New York City. About 65% of the

patients are Medicaid eligible. 44% are of Puerto Rican or other Latin American origin. 5% could be termed "hippies". 45% are boys. A review of records of 523 patients registered in a 16 month period shows that 31% are known to be seriously involved with drugs other than marijuana. These are patients not referred to our service for a drug problem, but, for various medical conditions or routine examinations. 19% of our patients use heroin; 9% use barbiturates and other depressants; 7% use amphetamine and other stimulant pills ("ups"); 6% use LSD or mescaline; 5% use methedrine by injection ("speed"). Mixed use is common. 37% of these drug abusers are 16 years of age or younger. 60% are boys. 36% of the drug users are of Puerto Rican or other Latin American origin. 13% are "hippies". The majority live at home and attend school. Information concerning patterns of use, means of acquiring drugs, attitudes and knowledge of effects, based on in-depth interviews with about 40 drug users, will be discussed.

IMMUNOLOGY

HL-A phenotypes in leukemias: A family study. SUSIE W. FONG, ROBERT LUNDAK, and SHARON BRITT (Intr. by Thos. L. Nelson). *Univ. of Calif., Irvine, Calif.*

The acceptance or rejection of leukemic cells by the host may be related to transplantation immunology. Viral infections of cells are known to alter the antigenic composition of cell membranes and lead to the development of new antigens, deletions with replacement by fetal forms, and/or partial development of specific antigens. Search for aberrant HL-A antigens in leukemias may lead to the discovery of tumor-specific antigens. HL-A phenotypes were determined by microcytotoxicity and absorption methods in 20 patients with acute lymphocytic leukemia (ALL) and 50 family members; 10 patients with chronic granulocytic leukemia; 20 patients with other lympho- and myelo-proliferative disorders and tumors. Seven of 16 ALL patients possessed one or two HL-A antigens not expected from family analysis. The aberrant HL-A specificities differed from patient to patient. Five of 16 ALL patients demonstrated three HL-A alleles per segregant group not found in family members. The gene frequency of HL-A7 in the ALL group was lower than expected ($p < 0.01$). There also appears to be a paucity of HL-A specificities at the locus of the second segregant group (5, 7, 8, 12) in ALL ($p < 0.01$). No relationship was found between certain HL-A genotypes and ALL. Malignant transformation of cells did lead to aberrant HL-A patterns. The discovery of HL-A specificities unique to the ALL patient through family analyses may form a basis for the development of immunotherapy.

The immunosuppressive effects of maternal plasma. SANFORD LEIKIN. *Children's Hosp. of D.C., and Geo. Washington Univ. Sch. of Med., Washington, D.C.*

Although the anatomical barrier which exists between the pregnant female and her fetus appears to be important, a modification of the immune response to histocompatibility differences may also play a role in the symbiosis of pregnancy. The one-way mixed lymphocyte reaction (MLC) expresses the reactivity of one population of cells against the histocompatibility antigens of another population. Therefore, the MLC was used to test the reactivity of newborns' and maternal lymphocytes to each other. It was found that, although maternal lymphocytes reacted to stimulation by cord blood cells, maternal plasma suppressed this response. It was also found that cord blood lymphocytes were

hyporesponsive to stimulation by maternal cells as compared to adolescent-mother controls. This hyporeactivity was intensified in the presence of maternal plasma.

Further in vitro studies revealed that vaccinia to which the subjects had been previously immunized and suboptimal doses of phytohemagglutinin (PHA) stimulated pregnant females' lymphocytes significantly less well than adult males' cells, and that similarly stimulated cultures prepared with plasma from these females inhibited transformation of their own and male donors' lymphocytes. It appears, therefore, that maternal plasma contains factor(s) which inhibit(s) the MLC reaction, antigenic and PHA in vitro lymphocyte stimulation. This inhibitory effect of maternal plasma may be important in modifying the reactivity of maternal cells to fetal tissue. The inhibition of fetal lymphoid cells in the maternal circulation may also afford protection to the mother in a fetal graft-maternal host reaction.

Hormonal basis for sex differences in immunity. JEAN F. KENNY and JANET A. GRAY (Intr. by Richard H. Michaels). *Children's Hosp. of Pittsburgh, Pittsburgh, Pa.*

To investigate the greater susceptibility of the male to severe infections we have studied antibody production by individual spleen cells in immature and adult Swiss mice. Previous studies using the Jerne agar-plaque technique have shown: 1) following enteric colonization with *E. coli* or injection of small numbers of heat-killed *E. coli* (HKE) significantly more cells produce specific antibody in weanling and adult females than males; 2) after injection of small numbers of HKE (3×10^5) sexually mature females respond with significantly greater numbers of antibody producing cells (APC) than weanling females, but responses of adult males are only slightly better than those of male weanlings; 3) mean amounts of antibody produced by male and female cells are the same.

Responses of prepubertal ovariectomized females (OF) were compared to those of equal numbers of their sham-operated male (SM) and female (SF) littermates. Three weeks postoperatively, 4 days after intraperitoneal injection of 3×10^5 HKE, total APC/spleen ranged from 0-600. When individual totals of APC were ranked, responses of OF and SM were alike and those of SF were significantly better ($p < .001$). $1\frac{1}{2}$ SF vs. $\frac{1}{2}$ SF and $\frac{7}{30}$ SM were in the top third of the rank order. In a similar study total APC for castrated males and SM were the same. Estradiol-17 β (500 ng) was given to 50 weanling males the week of challenge (5×10^5 HKE). In responses ranging from 0-1550 APC/spleen, the estradiol-treated males ranked higher than 53 saline-injected littermate controls ($p < .05$).

Findings show that the significantly better immunologic responsiveness of the female is dependent on ovarian function; small amounts of estradiol appear to enhance the proliferation of immunocompetent cells.

Further definition of two distinct types of congenital defects in plasma cell differentiation resulting in agammaglobulinemia. ALEXANDER R. LAWTON, DALE E. BOCKMAN, and MAX D. COOPER. *Univ. of Ala., Birmingham, Ala., and The Med. Coll. of Ohio at Toledo, Toledo, Ohio.*

Functional and morphologic evaluation of the immune system was carried out on 2 females with sporadic agammaglobulinemia (SA) dating from infancy and a male with X-linked agammaglobulinemia (XLA). All 3 patients had profound hypogammaglobulinemia, lacked isoagglutinins, and failed to synthesize antibodies to Salmonella H and O antigens following immunization.