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Confidence limits for the incidence of metabolic disorders screened in Switzerland.

The incidence of rare disorders in the population is usually indicated in the literature by a rate, without any confidence limits added. Using data of the Swiss screening program for metabolic disorders in newborns (provided by R.Gitzelmann and R.Bütler) we found that the occurence of elevated phenylalanine is compatible with a POISSON distribution (Chi square test, Kolmogorov-Smirnov test). Thus confidence limits can be established. Comparisons between different populations are easily tested statistically. The 95% confidence limits for the incidence of metabolic disorders screened in Switzerland are as follows:

	per 100'000	1 in
Hypothyroidism (TSH)	22.2 -37.3	2'684- 4'508
Hyperphenylalaninemia	8.52-12.5	8'006- 11'744
Galactosemia	1.19- 3.19	31'390- 83'707
Maple syrup urine disease	0.33- 1.52	65'707-299'893

The incidence of hypothyroidism found in Switzerland by TSH-assay is significantly higher ($p<0.025$) than that found in Quebec (16.6-25.3/100'000)by T_4 screening.

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Gestational length and erythrocyte acid phosphatase (ACP_1) phenotype. PASCONE R.*, LUCARELLI P.*, MATTEUCCI P*., LUCARINI N*, GLORIA-BOTTINI F*, CARAPELLA E*, QRZALESI M. and BOTTINI E. Dept. of Child Health, Univ. of Rome and Dept. of Child Health, Univ. of Sassari, Italy.

We have previously reported a significant association between ACP_1 phenotype and serum bilirubin levels during the neonatal period (Lancet 1:918, 1976). ACP_1 acts in vivo as a flavin-mononucleotide phosphatase and may play a significant role during foetal development. A prospective study of 489 infants consecutively born in Rome was performed. Mean values for gestational age were similar among different ACP_1 phenotypes, but variance ratios were highly significant ($p < 0.01$). The proportion of preterm infants (< 37 weeks gestation) was lowest (3.6%) among phenotypes heterozygous for P^b allele (BA and CB, N°=192), intermediate (6.7%) among homozygous B phenotypes (N°=238) and highest (13.6%) among phenotypes without P^b (A and CA.N°=59). These data indicate that ACP_1 may affect the length of gestation and that heterozygosity for P^b allele of ACP_1 may represent an advantage in neonatal selection. They also provide the first clear example of the postulated selective advantage of heterozygotes for the main allele (P^b) of a "normal" polymorphism (ACP_1).

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Study of nine genetic polymorphisms in asthmatic children. RONCHETTI R.*, TRAMUTOLI G.*, MACRI F.*, DISCEPOLI L.*, CARAPELLA E.*, BOTTINI E. Depts. of Pediatrics and Child Health, University of Rome-Italy.

In order to better understand the genetic background of childhood asthma we determined in a group of asthmatic children living in Rome the phenotype for 9 polymorphic systems: ADA, PGM1, AK, Hp, ABO, Rh, MNSs (77 children), HLA A and B (36 children). Significant differencies between asthmatics and normal population were found for ADA (lower frequency of ADA 2-1, $p < 0.02$), Secretor (lower frequency of Secretors $p < 0.01$), HLA (higher frequency of A_{32}, $p < 0.01$), Rh (lower frequency of cc in males, $p < 0.05$). Further investigation was carried out for ADA in another group of asthmatic children mostly from the northern part of Italy which confirmed the negative association between ADA 2-1 and asthma (total children 157, $p < 0.01$). The analysis of clinical characteristics of patients showed that the age of onset of asthma was significantly lower for ADA 2-1. Moreover there was a tendency for the same group to have heavier familiarity for atopy and lower frequency of positive prick-test.

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Adenosinedeaminase (ADA) polymorphism and immunological functions.LUCARINI N*,LUCARELLI P*,GLORIA-BOTTINI F*,RONCHETTI R*,CARAPELLA E*and BOTTINI E. Depts.of Pediatrics and Child Health,Univ. of Rome,Italy.

It is well known that individuals homozygous for a rare silent allele of ADA may experience a severe combined immunodeficiency. By analogy we have investigated the possible relations of normal ADA polymorphism with some conditions (such as asthma and feto-maternal relationship)in which immunological mechanisms may play an important role.179 children with bronchial asthma,46 couples with unexplained habitual abortion (AB),24 couples with unexplained sterility (ST),229 consecutive newborns (CN) and 93 consecutive low-birth-weight infants (LBW) were studied.The proportion of ADA2-1 phenotype was drastically reduced in asthmatic children ($p<0.01$) and in AB and ST couples ($p<0.02$).ADA2-1 phenotype was associated with a significant reduction ($p=0.01$) in the variability of gestational length in CN;furthermore,the proportion of ADA2-1 was significantly lower in LBW than in CN and normal adults ($p<0.05$).The present data indicate for the first time that genetic variability due to the "normal" ADA polymorphism may be,at least in part,responsible for the variable behaviour of immunological functions and related pathological conditions;they also provide evidence in favour of a selective advantage of ADA heterozygote. (Work supported by CNR)

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Transcutaneous estimation of PaO_2 and $PaCO_2$ with a single electrochemical sensor.

22 studies lasting 3-6h were performed on 10 newborn infants with respiratory illnesses to assess the accuracy of a transcutaneous electrochemical sensor designed by us to estimate PaO_2 and $PaCO_2$ simultaneously. The sensor was calibrated in vitro and in vivo. $tcPO_2$ was compared with PaO_2 recorded by a Searle intravascular electrode or by a Dräger transcutaneous electrode that we have previously shown to give an accurate estimate of PaO_2. $tcPCO_2$ was compared with the $PaCO_2$ of samples of arterial blood. The relation between $tcPO_2$ and PaO_2 after in vitro calibration was $tcPO_2 = 0.95\ PaO_2 + 11.93$ ($r = 0.69$, $p < 0.001$) and after in vivo calibration $tcPO_2 = 1.00\ PaO_2 + 1.27$ ($r = 0.89$, $p < 0.001$). After in vitro calibration $tcPCO_2 = 0.99\ PaCO_2 + 9.88$ ($r = 0.89$, $p < 0.001$) and after in vivo calibration $tcPCO_2 = 0.98\ PaCO_2 - 2.33$ ($r = 0.97$, $p < 0.001$). We conclude that PaO_2 and $PaCO_2$ could be estimated transcutaneously by the sensor and that the accuracy of estimation was improved by in vivo calibration.

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Ethnic Differences in Perinatal Mortality.

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Increasing attention is being focussed on perinatal health in the United Kingdom but little information relating to ethnic differences is available. This is especially important since clinical experience indicates that differences do exist.

The Perinatal mortality (PNM) of births to mothers living in the inner London Boroughs of Lambeth,Southwark and Wandsworth delivering at St.Thomas' Hospital from 1969 to 1976 has been examined. The PNM rate in the West Indian population is significantly higher than the UK white rate $P<0.001$. This increased West Indian PNM is confined to babies of 37 weeks gestational age and above and 2.0kgm birth weight and more. The relative risk of perinatal death in the West Indian compared with UK white mothers is 1.4 at 2.5 to 2.9kgm rising to 3.0 at birth weights exceeding 4.0kgm. This excess is only partially explicable by social class differences. The increased relative risk is seen in West Indian women over 25 years of age and in all parity groupings. West Indian women with pre-eclampsia or who are delivered with the aid of forceps are at greatly increased risk.

These findings suggest the existence of a generation effect and indicate that there is an urgent need for further study.