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145

THE EFFECTS OF DIFFERING FOETAL GROWTH RATES ON COGNITIVE PERFORMANCE IN A NATIONAL SAMPLE OF TWINS

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A national sample of twins, all born in one week in Gt Britain, were investigated to examine the relationship between foetal growth rates and cognitive performance. Complete data was available for 293 of the 434 who were born in the week.

A quadratic function was fitted to a scatter plot of birthweight by gestation. From this function it was possible to predict a birthweight from a known gestational age. Subsequently, it was possible to identify individual birthweights as being either greater than or less than the value predicted by the regression equation.

Using this information, subjects were assigned to one of six foetal growth rate groups. There was considerable overlap in birthweight amongst the six foetal growth rate groups. Within each group individual test scores and a principal components analysis of a battery of cognitive tests were recorded. It was noted that test scores were greatest for those subjects whose birthweights were greater than the predicted value and lowest for those subjects whose birthweights were less than the predicted value.

Effect sizes were predictably small, but demonstrated that foetal growth rates were a better predictor of cognitive performance than birthweight alone. It is suggested that some low birthweight twins, with short gestational ages, may not be at a cognitive disadvantage compared to higher birthweight twins with longer gestational ages.

146

WHY ARE MZ TWINS DIFFERENT? OVERVIEW.

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MZ twins are never identical. If they were, their parents would despair. There are many genetic and antenatal environmental causes of discordant/divergent phenotypes at birth. Genetic/ embryologic causes include: unequal division of the inner cell mass, chromosomal mosaicism, skewed X chromosome inactivation, discordant gene imprinting, different phenotypic severity of expression of genetic disorders and malformations, post-zygotic mutations. Antenatal environmental causes include: adverse placental implantation site, consequences of mono- chorionic placentation, birth order, anatomic presentation, delayed delivery of the second twin, discordant transplacental and ascending infection. MZ phenotypes may reconverge after birth.

Expectation of "identity" in MZ twin genotype and phenotype is therefore excessive. This could be factored into calculations of concordance rates for QTLs, etc in MZ/DZ twin studies.

The frequency and severity of these post-zygotic events are not known. They challenge our ability to diagnose zygosity in like-sexed dichorionic twins. PCR-based kit methods using buccal cells are convenient, provided that sufficient statistical power is derived from adequate numbers of loci, thus avoiding the diagnosis of pseudomonozygosity. Likewise, post-zygotic mutational differences in MZ twin pairs should not be overinterpreted as indicating dizygosity.

Widely agreed parameters for reliable zygosity testing are now required. ISTS is the appropriate forum for discussion and formulation of these parameters.

147

DISCORDANCE OF ANISOTROPY PATTERN IN BRAIN MR DIFFUSION IMAGING BETWEEN MONOZYGOTIC TWINS DISCORDANT FOR SCHIZOPHRENIA

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Neuroanatomical abnormalities of schizophrenia have been demonstrated by in-vivo brain imaging of large number of samples and by postmortem neuropathological studies on small number of samples. Although aberrant neuronal connections have been considered to be a major pathophysiological hypothesis of schizophrenia, brain imaging methods as far have not realized to visualize neuronal tracts. We have applied a magnetic resonance diffusion imaging to both normal monozygotic (MZ) twins and MZ twins discordant for schizophrenia in order to detect aberrant neuronal connections in schizophrenia.

Normal corpus callosum in MZ twins showed an apparent diffusion anisotropy (DA) pattern reflecting a direction of neuronal tract, while a loss of DA pattern was observed for a deformed corpus callosum. These proved a potential validity of the method to visualize neuronal tracts. DA patterns of region of interests including temporal and frontal lobes were concordant between MZ twins in normal pairs, while those were discordant between MZ twins discordant for schizophrenia. These results suggested aberrant neuronal connections in schizophrenia.

148

DATA BASE - " TWIN REGISTER OF S.-PETERSBURG"

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Twin Population Data Base created on the base of Paradox for Windows and allows to provide the information search for genetic studies in different areas of fundamental and applied scientific knowledge (psychology, medicine, pedagogic, ecology, sociology). One of the main human genetic methods - twin method - was taken as a principle of the Register. The opportunity of collection, comparison and generalizing human characteristics, obtained by modern methods based on twin model have been realized in Register. The original twin zygocity determination methods have been worked out, modern psychological tests have been adapted, the original systems of recording, storage and processing bioelectrical parameters have been created. Data concerning 1319 twin pairs have been collected according to following parts: certificate data, medico-biological data, psycho-physiological data, social-economical data, which fill up every week.

The experimental Twin Register Data Base can be used to solve the fundamental problems of the correlation between genetic and environmental factors of individual human features formation.

The data are of interest for medicine, psychology, pedagogy and other areas of humanities. Due to their psycho-biological features, twins belong to the group of risk and demand the attention of specialists on different sciences.

In according to the conditions of Twin Register, the information included in the Data Base is confidential. That's why the access to the data can be carry out only by responsible executers.

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149

DISCORDANT BRAIN REGIONS BETWEEN MONOZYGOTIC TWINS DISCORDANT FOR PANIC DISORDER

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We obtained MRI scans of contiguous T1-weighted coronal brain sections of 26 year-old male monozygotic (MZ) twins discordant for panic disorder with their informed consents. Regions of interest (ROI) were measured blindly and manually tracing fourfold-enlarged images on a computer display by an experienced technician, succeeded by automated volume computations.

Both the left and right, though much prominent on the right, hippocampus of the affected (twin A) were 10% or more smaller than those of the non-affected (twin B), and the right temporal horn of the lateral ventricle (THLV) of twin A was 10% or more larger. Other ROIs showed very similar sizes between the twins, even though the left cerebrum and THLV, and the right frontal and temporal lobes were 5% or more smaller in twin A.

The medial temporal region was especially different between the affected and well twins, presenting a decrease of volumes in the parenchymal ROIs and an increase in spatial ROIs predominantly in the right, while for the frontal lobe rather on the left.

An unknown process of the volume reduction in the right medial temporal region and possibly of the frontal lobes is involved at least in the development of PD for twin A, indicating the involvement of these regional brain abnormalities in general PD, although other ROIs such as other limbic structures, subcortical nuclei and pons should be included in future morphological and functional brain imaging study on PD.

150

MONOZYGOTIC TWINS DO NOT HAVE IDENTICAL GENOMES

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Concordance studies in monozygotic and dizygotic twins have been used to determine genetic and environmental contributors to phenotypes. These studies assume that monzygotic twins have identical genomes while genomes from dizygotic twins have 50% identity. These assumptions fail to take into account epigenetic and somatic genomic changes that may account for discordance in phenotype. We have developed a genomic differential display method that allowed us to assess the level of genome identity and to identify genomic differences de novo. This approach reduces genome complicity and targets analysis to genomic regions containing specific genomic sequences. In monozygotic twins, the level of genome identity is very high and very close to background levels. Despite this several specific differences were identified and charaeterized in detail. One difference represents a series of multiple single base changes while another represents a de novo recombination event. These and other genomic changes are being characterized in schizophrenic and normal twins and other samples of ill and well individuals.

151

WHITE YAMS (*DIOSCOREA ROTUNDATA*) AND SOCIOECONOMIC STATUS AS RISK FACTORS FOR TWIN BIRTHS IN SOUTHWEST NIGERIA

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Background Multiple pregnancy is a major cause of prematurity and other complications. The objective of the present study is to define the relationship between biosocial and dietary factors, including yam consumption and the high incidence of multiple births in southwestern Nigeria. **Method** A case-control study was carried out in two hospitals in Ife, Osun State, Nigeria, an area inhabited principally by Yoruba people, who have the highest recorded rate of multiple births in the world at 41.6 twin births per 1 000 deliveries. Two hundred and fifty four women were interviewed. Each mother of twins or triplets ("twin mothers") (case) was matched by age with two singleton mothers. The survey elicited information on the biosocial profile of the women and their husbands and their dietary habits. **Results** The results showed that anthropometric characteristics were not risk factors for multiple births. However, socioeconomic status and diet remained significant risk factors. There was an inverse dose-response relationship between the number of household items (p=0.009) and multiple births. There was also a direct dose-response relationship between number of servings of yam *(Dioscorea Rotundata)* per week and multiple births (p=0.00112). **Conclusions** Controlling for age and parity, we found dose-response relationships between yam consumption and twinning. These results and the evidence of a recent decline in multiple births in Nigeria must be set against the background of a general improvement in the standard of living. This is especially true since it remains to be determined what the genetic contributions to this picture are.

152

INCIDENCE AND RISK FACTORS FOR MULTIPLE BIRTHS IN SOUTHWESTERN NIGERIA

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Objectives: A prospective multicenter demographic survey performed over two years (July 1992 to June 1994) was performed to determine the incidence and risk factors for multiple births in southwestern Nigeria.
Study Design: We obtained data on maternal characteristics and birth outcomes in 14 private and public hospitals in the Ile-Ife and Iliesha areas of southwestern Nigeria.
Results: Of 6,414 deliveries, there were 267 twin pairs and 9 triplets giving an incidence of 41.6 per 1 000 and 1.4 per 1 000 births for twins and triplets, respectively. There was also an inverse relationship between socioeconomic status and level of education, and multiple births.
Conclusions: These data confirm the continuing high rate of multiple births in Nigeria, support the presence of epigenetic factors, and further substantiate the suitability of this population for studies to provide a better understanding of multiple pregnancy.

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