of this complex trait, ARHI is still poorly understood. We hypothesized that variance in hearing ability with age is largely determined by genetic and epigenetic factors. We collected audiologic and genetic data on female twins of Northern European ancestry and determined the heritability of hearing ability with age. A web-based speech-to-noise ratio (SNR) hearing test was compared with pure-tone thresholds to see if we could determine accurately hearing ability on people at home and the genetic contribution to each trait compared. Volunteers were recruited from the TwinsUK cohort. Hearing ability was determined using pure-tone audiometry and a web-based hearing test. Using structural equation modeling based on the classical twin model the heritability of ARHI, as measured by the different phenotypes, was estimated and shared variance between the web-based SNR test and pure-tone audiometry determined using bivariate modeling. Pure-tone audiometric data was collected on 1033 older females (age: 41-86). 1970 twin volunteers (males and females, age: 18-85) participated in the SNR. The SNR test showed a sensitivity and specificity of 89% and 80%, respectively, in comparison with pure-tone audiogram data. Univariate heritability estimates ranged from 0.70 (95% CI: 0.63-0.76) for (PC1-PC2) to 0.45 (95% CI: 0.18-0.63) for SNR. The genetic correlation of PC1-PC2 and SNR was -0.67 showing that the 2 traits share variances attributed to additive genetic factors. ARHI showed considerable heritability in our sample. We have shown that the SNR test provides a useful surrogate marker of ARHI. This will enable a much larger sample to be collected at a fraction of the cost, facilitating future genetic association studies. Monozygotic twins discordant for hearing ability with age could be used to understand the epigenetic basis of hearing.

GENETICS OF METABOLIC SYNDROME PERSISTENCE

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Metabolic syndrome (MetS) is a cluster of insulin resistance and its complications such as and hypertension. MetS and its components are not fixed, but do change across time. Although an association between MetS and cardiovascular disease is well-established, the factors that result in fluctuations in MetS or effects of persistence in MetS are not well known. The aim of this study is to explore genetic and environmental influences on the persistence of having MetS. *Methods:* The study subjects were participants in the Healthy Twin Study who agreed to informed consent and took clinical examinations including body measurements and blood sample tests. A total of 1,651 participants were followed for their MetS status. Average duration between two check-ups was 2.60 years. MetS was defined by the criteria of International diabetes Federation (IDF) and National Cholesterol Education Program Adult Treatment Panel (NCEP-ATP). We also categorize them into four groups according to their changes in MetS status; normal to normal (NN), normal to MetS (NM), MetS to normal (MN) and MetS to MetS (MM). Heritability of each status change in MetS, NM, MN, and MM were relatively analyzed compared to heritability of NN. To estimate heritability of status change in MetS, we fitted a variance component model to partition the total phenotypic variance of MetS changes into additive genetic (da2), shared environmental component (dc2), and unique environmental components (de2). Shared environments (dc2) were estimated in three levels; household effects, sibling effects, and generation-specific effects within household. The Sequential Oligogenic Linkage Analysis Routines program (SOLAR, ver. 4.2.7; Southwest Foundation for Biomedical Research, San Antonio, TX) was used for estimating each component *Results:* Prevalence of metabolic syndrome increased at the second visit (20.29% as IDF and 17.69% as NCEP-ATP) than that of the baseline (18.41% as IDF and 17.14% as NCEP-ATP?). We identified that there is apparently genetic influences on not only consistent status, but also change in status of having MetS as IDF and NCEP ATP definition both. And the trend as IDF definition was coherent also as NCEP ATP. First, according to the definition of IDF, genetic influence on change of normal status to metabolic syndrome (NM) comparing to that of consistent normal status (NN) was not significant at every sharing groups. Change of metabolic syndrome to normal status (MN) comparing to that of consistent normal status was 42% of heritability within family groups, generation groups and monozygotic twins groups and 37% within siblings. Heritability of MM comparing to that of NN was 49% within sibling groups and within monozygotic twins, 46% within generation groups and no heritability within family groups. Second, genetic influences on NCEP ATP-defined Mets status were as below. No heritability on the NM change was significant in any sharing groups. Genetic influence on MN change comparing to that of NN status was 48 % in siblings and 54% in all other sharing groups. Heritability on MM was 42% in family sharing groups and 62% in other groups.

ASSOCIATION BETWEEN PERSONALITY TRAITS AND OBESITY INDICES: FAMILY AND CO-TWIN ANALYSIS

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Purpose: Personality traits of an individual affect one's attitude towards life and one's life style factors determin-

ing health status. Since emotional disruption, such as depression and mood disorders, and unhealthy life habits are established risk factors of obesity, investigating the association between personality, life style, and obesity will lead to development of efficient intervention or preventive measure for obesity, according to their personality profiles. To this end, we attempted to explore the associations between Temperament and Character Inventory (TCI)'s seven dimensions and obesity indices: body mass index (BMI), waist circumference, waist hip ratio (WHR), trunk and total body fat percent measured by Dual-energy X-ray absorptiometry (DXA) in Korean twins and their families Additionally, we aim to discriminate environmental and genetic effect of TCI on obesity using pair-wise analysis of each and combined monozygotic twins (MZ), dizygotic twins (DZ) and sibling pairs adjusted for age and sex. We expected that estimating non-genetic association between personality traits and obesity will specifically show potential target chains interconnecting personality, life style and obesity. *Methods:* A total of 3079 individuals (1217 men, 661 families) of the Healthy Twin Study in Korea were involved in this study. This population includes 531 MZ pairs, 120 DZ pairs, and 1172 sibling pairs. Association between TCI and obesity was analyzed using adjusting for age, sex, smoking history and alcohol consumption. A random effect model (REM) was applied to adjust familial correlations. For co-twin and sib-pair analyses pair-wise regression models using pairwise-difference values were used. *Results:* In conventional regression analyses (REM), among seven domains of TCI, novelty seeking had the strongest association with BMI. Decreased persistence (ß = -0.0003), self-directedness (ß = -0.00024), cooperativeness (ß = -0.00028), and self-transcendence (ß = -0.00026) had association with WHR. In pair-wise regression model, an association between persistence and WHR /trunk fat percent were further dissected; ßW in MZ data was higher than ßW in DZ-sibling data and pooled data, indicating that persistence is associated obesity, and in this association, there are more environmental effects than genetic effect. *Conclusions:* The results all confirm the previous findings that self-transcendence resulted with negative association with WHR. By comparing the ßW of different datasets, we could conclude that there is high environmental effect on the association, and that there is more environmental effect on the TCI associated obesity than genetic effect, suggesting an individual's personality profiles can be integrated into personalized intervention of obesity.

WEIGHT GROWTH OF TRIPLETS FROM INFANCY TO TWELVE YEARS OF AGE

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Introduction: Triplets have been found to be behind singletons in their physical development even in mid-childhood in spite of the rapid catch-up growth during the first year of life. However, there have been no reports of weight growth of triplets after six years of age. The purpose of this study was to analyze the characteristics of weight growth in Japanese triplets from birth until 12 years of age. *Methods:* The participants of this study were recruited from the Osaka City University Higher Order Multiple Births Registry, which consisted of 578 mothers with triplets who were born between 1978 and 2006. The data were collected through a mailed questionnaire sent to the mothers (response rate 67.0%). After excluding 36 triplets with unknown sex, we had 1,128 triplet children of 376 mothers in our data. For these births, data on triplets' weight growth, gestational age, sex, parity, maternal age at delivery, maternal height, and maternal body mass index were obtained from records in the Maternal and Child Health Handbooks and records in the school which children receive health check-ups. The weight deficit of the triplets was calculated as the percentage difference between the value of the general population and that of the triplets divided by the value of the general population. The weight deficits were calculated using mean values of the official growth standards. The statistical significance of regression coefficients of the covariates, where assessed from the fixed effects and these were adjusted for familial clustering (i.e. sets of triplets) by introducing random effect in the linear mixed model. The factors associated with weight at six, eight, 10 or 12 years of age were explored by the linear mixed effects multiple regression analysis. *Results:* The weight deficit of the triplets compared to the general population of Japan remained between 10% and 17% until 12 years of age. Moreover, at 12 years of age, the differences of weight between the general population and triplets were approximately -4.75 kg for boys and -6.00 kg for girls. Very low birth weight had the strongest contribution to body weight until eight years of age. After eight years of age, maternal body mass index was a significant factor affecting the weight of triplets until 12 years of age. *Conclusions:* Triplets have lighter weight than singletons and the weight deficit of the triplets compared to the general population of Japan remained between 10% and 17% from six to 12 years of age. Further follow-up of the triplets should reveal whether their growth catches up with singletons before adulthood.

THE NATURAL HISTORY OF THE MONOCHORIONIC TWIN PREGNANCY: ANALYSIS OF A CASE STUDY

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Objectives: To report the natural history of the monochorionic twin pregnancy in a group of patients supervised through a specific surveillance's protocol and to identify possible risk factors for fetal and perinatal mortality and morbility. *Methods:* A prospective study over a group of 178