Study on the Association and Intervention of Personality Trait Gene Polymorphisms and Mci Elderly People

Qiang Li[1], Xiumei Ma[1], Deshui Liu[1], Yingyan Zhang [1],Yin Gao[1], Guiling Li[1], Xuewen Yang [2],Yuexian Ma [3], Wei Liu [3], Hongjuan Wei[1*]

[1] Qiqihar Medical University, Qiqihar, Heilongjiang, 161006, China

[2]The Third Affiliated Hospital of Qiqihar Medical University, Qiqihar, Heilongjiang, 161000, China

[3]The Second Affiliated Hospital of Qiqihar Medical University, Qiqihar, Heilongjiang, 161006, China

*Corresponding author:Hongjuan Wei

Keywords: Trait gene polymorphisms, Mci elderly people, Personality trait

Abstract: To explore the effects of single genes and interactions of Stin2, 5-HTTLPR, NET T-182C, and NET G-1287A on Eysenck personality traits in healthy Chinese Han population. Methods: Strictly follow the enrollment criteria to screen 367 healthy Chinese Han people, collect general demographic data, use the Eysenck Personality Questionnaire (EPQ) to measure the three dimensions of personality N, E, and P, and calculate the standard score (T) for each dimension , And divided by T50, each dimension is divided into two levels: neurotic and non-neurotic personality, introverted and extraverted personality, psychotic and non-psychotic personality; polymerase chain reaction (PCR) detection of Stin2, 5-HTTLPR, NET T-182C, NET G-1287A gene polymorphism. Use SPSSl3.0 statistical software for unit point data analysis: t-test, variance analysis to compare personality differences between genotypes and alleles, f-test to analyze the distribution differences of genotypes and alleles among personality dimension classes; use UNPHASED software Calculate the Global P value; use the MDR Software package to analyze the interaction among the genotypes of Stin2, 5-HTTLPR, NETT-182C, and NET G-1287A.

1. Introduction

Personality is a complex model imprinted with psychological characteristics or tendencies. It is composed of some stable characteristics and is a synthesis of all psychological characteristics. It affects and reflects the individual's attitude and behavior towards objective things, and is related to the occurrence of a variety of behavior problems. Studies have shown that personality is directly related to an individual’s cognition, emotion, and behavior, and is related to the individual’s learning, work, marriage and other aspects; personality as an independent risk factor affects the occurrence, development, efficacy and prognosis of a variety of physical diseases. ; Personality is also highly related to a variety of mental illnesses; most patients with mental illness have personality abnormalities before illness; the lifetime prevalence of personality disorders in the general population is about 10-13%, for individuals and society Bring serious negative effects. For this reason, personality-related research has attracted great attention in the fields of psychiatry, psychology and sociology. At present, it is generally believed that personality is the result of the combined effect of genetic factors and environmental factors. In the field of biology, studies of twins and adopted children show that the comprehensive heritability of personality traits is roughly 40%, but the exact mechanism is still far from ascertained. With the development and wide application of molecular genetics, there have been more than 50 personality-related candidate genes reported at home and abroad, and their wide scope and depth of research are eye-catching. Among them, 5. The serotonin system and the norepinephrine system are closely related to a variety of physiological functions and mental illnesses, and play an important role in the formation and development of personality. In the above-mentioned system, transporters affect the concentration of neurotransmitters in the synaptic cleft by regulating the reuptake of neurotransmitters in the

  DOI: 10.25236/iwass.2021.043

presynaptic membrane of nerves, thereby playing an important role in system regulation. For this reason, transporter genes have become the field of personality research. Important candidate genes.

1.1 Materials and Methods

The subjects of the study were 367 volunteers from healthy Chinese Han people, collected from May 2004 to April 2007. They were screened according to uniform standards. All individuals were unrelated and signed an informed consent form. Inclusion criteria: 18 years ⩽ age ⩽ 65 years; total score of the self-rating symptom scale SCL-90 ⩽ 160, and each factor score ⩽ 2 points. Exclusion criteria: past or present suffering from various mental illnesses and severe heart, brain, kidney and other physical diseases; having a family history of positive mental illness; having alcohol or other substance dependence or abuse. All individuals were tested for 5-HTT and NET genotypes, including 164 males and 203 females, aged 18-65 years old, with an average age of (29.11±10.81) years old.

Strictly trained psychiatrists with rich clinical experience were used to select study subjects in strict accordance with the enrollment criteria. Among them, the symptom self-rating scale (SCL-90) compiled by djDerogatis in 1973 and compiled by Wang Zhengyu was selected for selection. The scale includes somatization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, anxiety, hostility, horror, paranoia, psychosis and other ten factors. There are two main statistical indicators, namely total score and factor score. Score, total score = the sum of the individual scores, factor score = total score of each item that makes up a factor/number of items that make up a factor. According to the results of the national norm, screening positive can be considered if any one of the following criteria is met, and if it does not meet the inclusion criteria of this study, it needs to be eliminated: total score>160 points; any factor score>2 points. Collect general demographic data, including items such as gender, age, and education level.

2. 3 Discussion

Most personality measurement tools have their corresponding personality trait theories. Researchers of personality trait theory believe that personality traits are the basic unit that constitutes personality. There are only quantitative differences between people, but no qualitative differences. It describes Extensive regularity in human functions. At present, the main personality trait theories are: Allport’s Trait Theory, Cartel’s Theory of Personality Factors, Eysenck’s Multidimensional Personality Theory, and Big Five Personality Model Theory. Personality measurement tools developed from the above theories include the Cartel Sixteen Personality Factors Test (16PF), Eysenck Personality Questionnaire (EPQ), and revised NEO Personality Questionnaire (NEO-PI.P). Because the Eysenck Personality Questionnaire (EPQ) has good reliability and validity, its classification of personality dimensions has been verified in both experimental psychology and clinical research, and it has the advantages of different age groups, different cultures, and different races. Universality, so it has been widely used. The most widely used version in my country is the Eysenck Personality Questionnaire revised by Professor Gong Yaoxian. Eysenck’s multidimensional personality theory believes that personality has three basic types: neuroticism, introversion and psychoticism. The Eysenck Personality Questionnaire developed from it is to test the above three types. Among them, those with high neuroticism (N) scores are anxious, emotionally unstable, and have strong emotional responses to stimuli; those with low scores have slow emotional responses. Slight, easy to restore calm, gentle temperament, good at self-control. F hook J'F lean (E) High scorers are extroverted, good sociable, adventurous and exciting, emotionally easy: impulsive; low scores are introverted, quiet, introspective, dislike stimulation, and prefer a regular lifestyle . Spirituality (P) is also called stubbornness. People with high scores are lonely, don't care about others, have difficulty adapting to the external environment, feel dull, unfriendly with others, like provocative and disturbing; low scores can get along with others and can adapt well The environment is not rude and follow the wishes of the people. The scores for each of the above dimensions are distributed continuously, that is, from typical neuroticism to atypical

neuroticism, from typical extroversion to typical introversion, from typical psychosis to atypical psychosis, all of which are “continuum”, and all dimensions together constitute a continuum. A three-dimensional three-dimensional space, each individual can find their own position in this space, but different individuals' various personality traits may have different degrees of tendency, and their positions in the three-dimensional space are also different, which leads to the uniqueness of individual personality Some researches believe that the three dimensions of lake and EPQ are relatively independent, and the analysis significance is clear, which is conducive to research and use.

A large number of studies have shown that certain characteristics of personality are closely related to human physiological characteristics. Eysenck also believes that two-thirds of personality traits are attributed to genetic factors, and the relevant genetic basis is proved as follows: ① Although various social and cultural factors in different countries force individual behavior to be consistent with their nationality, there are three dimensions of personality It is still widely discovered. ② Personality types are relatively stable for both children and adults. Although individuals have various experiences over a period of time, their basic response types have not changed significantly. ③The study of twins shows that the basic personality types have a strong genetic basis. Comprehensive consideration and analysis, in this study, we chose the Eysenck Personality Questionnaire as a personality measurement tool to study the genetic basis of personality in the Han population in northern China.

2.1 Research on the Association between Gene Polymorphism and Personality Traits

The frequencies of the alleles T and C in the healthy Caucasian population were 69% and 31%, respectively, and the frequencies of the TT, TC, and CC genotypes were 50%, 39%, and 11%, respectively. The frequency of Tr, TC, and CC genotypes in healthy Korean population were 49%, 42%, and 9% 122j, respectively. In this study, the frequencies of T and C alleles detected in the Han population in northern China were 73.8% and 26.2%, respectively. The frequencies of the TI”, TC, and CC genotypes were 54.8%, 38.1%, and 7.1%, respectively. 1%. This study found that there is a statistically significant difference in the mean distribution of introverted personality dimensions among alleles of T-182C (Dancing. 2.680, P-0.008). People carrying alleles of T The average of the internal and extraverted personality dimensions (58.334-9.99) is lower than that of people carrying allele C (60.534-9.06). The average of the remaining personality dimensions is between genotype and allele There is no significant difference in distribution, and there is no difference in the distribution of its genotype and alleles within each personality dimension classification.

From the perspective of genetics, personality is the result of the interaction of multiple genes. Observing its association with personality from the perspective of a single gene inevitably has limitations. Therefore, this study is based on single gene analysis. Discussion of gene interaction. Traditional statistical methods, such as Logistic regression model or generalized linear model, are cumbersome when analyzing interactions between genes, and the results of model parameters are difficult to interpret, and they often lead to an increase in type II errors and reduce test efficiency. And when studying the gene interaction between multiple sites, each additional SNP site will increase the sample size exponentially. Considering that the frequency of each genotype is often different, even if the sample size is large, the data is distributed in The high-dimensional space is still relatively sparse, and it is very likely that some genotype combinations have no observations, which is the so-called “difficulty in dimensionality”, which may also lead to parameter estimation errors in the model. Compared with the traditional statistical method, the multi-factor dimensionality reduction method (Ring R) is a method of analyzing interaction without parameters and no genetic mode. It only needs to have the genetic data of each point to carry out genes. Gene interaction analysis. Its main features are: No need to specify genetic mode (dominant or recessive inheritance) and interaction model (linear or non-linear model, additive or multiplicative model); Combined with the MDR Software package, it can identify multiple sites High-level interactions between.

The MDR method to analyze gene-gene interaction has been successfully applied to the research

of sporadic breast cancer, atrial fibrillation and essential hypertension, but there are no relevant reports in the field of personality research at home and abroad. Not found after analysis 5. There is an interaction between Hrr and NET gene polymorphisms. The above two gene polymorphisms belong to two different systems. Perhaps as the results of this study show, the polymorphisms do not interfere with each other, perform their own duties, and have an impact on personality. However, we should still note that the results of this study may also be restricted by race, personality scale, and sample number, resulting in false negative results. Therefore, it is necessary to expand the number of sample cases and conduct verification under different races and different personality scales.

3. Conclusion

Personality is a complex trait, and its formation is affected by the combination of genetic factors and environmental factors. To study it, we must not only perform single-gene association analysis, but also pay attention to genes. Genes, genes. Interaction between environments. At present, we are still in the initial stage of analysis and research, and we cannot expect to reveal its full connotation, but the current discussion will help us to have a more comprehensive understanding of it in the future. If personality genetics is combined with personality psychology, neuroelectrophysiology and neuroimaging, it may be the direction of future research and development. The research results will shape a healthy personality, formulate personality intervention strategies, and effectively prevent and treat personality Related mental and physical diseases provide new ideas and theoretical basis.

4. Acknowledgment

Proj: General Program of Qiqihar Academy of Medical Sciences
Proj. No.: QMSI2019M-15.

References

[1] Ren Yan, Yang Hong, Cui Xiaohong, et al. Study on the association between serotonin transporter gene polymorphism and personality characteristics in healthy Han population. Chinese Journal of Modern Internal Medicine, 2007, 004(002): 97 -99.

[2] Yang Daoliang, Liu Han, Wu Yujie, et al. Association study of aggressive behavior with DRD4 gene polymorphism and personality characteristics in patients with bipolar disorder. Journal of Shanghai Jiaotong University (Medical Edition), 2020, 40(3) .

[3] Li Xinrong, Xu Yong, Wang Yanqiong, et al. Association of norepinephrine transporter T182C gene polymorphism and personality characteristics in Han population. Chinese Tissue Engineering Research and Clinical Rehabilitation, 2007, 11(52)): 10547-10549.

[4] Jia Xin, Han Yajun, Xu Rong, et al. ApoE gene distribution characteristics and the relationship between blood lipid levels and cognitive dysfunction in middle-aged and elderly people in Northwest China. Heart Journal, 2018, v.30; No.149(01): 13-16.

[5] He Lu, Yuan Yefeng, Ren Zhengfa, et al. Association study of apolipoprotein E gene polymorphism and mild cognitive impairment in the elderly. Journal of Anhui Medical University, 2015(10): 1468-1470.

[6] Parida Ablizi, Kabinur Keyim, Zulifiya Ajimu, et al. Vitamin D receptor gene polymorphisms in the elderly with mild cognitive impairment in Han ethnicity in Xinjiang the correlation of serum 25(OH)D levels. Chinese Journal of Gerontology, 2019, 039(023):5726-5730.

[7] Xu Lanping, Huang Lijia, Liu Jingzhong, Zhang Yuqing, Zhang Jianxin. Anxiety-related personality traits and serotonin transporter gene polymorphisms. Chinese Journal of Medical Practice, 2004.

[8] Chen Jing, Huang Wenyong, Yang Jingyuan, et al. The relationship between ApoE gene polymorphism and vascular factors and the incidence of different subtypes of MCI. Modern Preventive Medicine, 2011(08): 1401-1403.