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GUANGZHOU MEDICAL UNIVERSITY
AFFILIATED BRAIN HOSPITAL

GRIN2B gene polymorphism in chronic ketamine users

Ni Fan^{a*}, Lina An[†], Minling Zhang[†], Hongbo He^a, Yanling Zhou^a, Yufen Ou^a

The Affiliated Brain Hospital of Guangzhou Medical University (Guangzhou Huiai Hospital), 36 Mingxin Road, Liwan District, Guangzhou, Guangdong Province, 510370, China.

1. Background

Increasing evidence indicates that the glutamatergic system, particularly the N-methyl-D-aspartate (NMDA) receptor, has played an important role in the rewarding effects of addictive drugs, and genetic polymorphisms in GRIN2B being associated with schizophrenia. Whether GRIN2B gene plays a role in vulnerability in ketamine use is unexplored. The allelic variants of the NMDA Receptor 2B (GRIN2B) in chronic ketamine users were examined, and the association between GRIN2B gene polymorphism and ketamine use conditions were also analyzed.

3. Results

- 3.1 Demographics and Clinical data of ketamine users and control subjects (table 1).
- 3.2 Genotypic distribution of the GRIN2B gene polymorphisms in ketamine users and control subjects (table 2).
- 3.3 Allele frequency of SNPs in ketamine users and control subjects (table 3).
- 3.4 Association between drug use characteristics and genotypes of four GRIN2B SNPs in ketamine users. Ketamine users of genotype TT and CC of rs1806201 had earlier onset of ketamine use than subjects of genotype TC. The dose of ketamine consumption per day of use was higher in genotype GG of rs7301328 than that in those with CG in ketamine users.

4. Conclusions

GRIN2B gene polymorphism may play a role in ketamine abuse.

5. Acknowledge

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2. Methods

Four single nucleotide polymorphisms (SNPs) of GRIN2B, rs890, rs1806201, rs7301328 and rs1805502 were examined in 151 male chronic ketamine users and 80 control subjects using a real-time PCR with the TaqMan[®] assay system. Clinical symptoms in ketamine users were evaluated with the Positive and Negative Syndrome Scale (PANSS), Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI).

Table 1.

	Ketamine users(n=151)	Control subjects(n=80)	t/ χ^2	P
Age (years)	26.00 $\pm$ 4.95	27.43 $\pm$ 7.86	-1.686	0.093
Education (years)	10.41 $\pm$ 2.73	12.25 $\pm$ 2.02	-5.302	0.000**
Alcohol				
Drink frequently ^a	41(27.3%)	5(7.1%)	11.765	0.001**
Not drink frequently ^b	109(72.7%)	65(92.9%)		
Tabacco				
Smoke frequently ^c	142(94.7%)	32(45.7%)	69.160	0.000**
Not smoke frequently ^d	8(5.3%)	38(54.3%)		
Age of first ketamine use (years)	19.64 $\pm$ 5.00	--		
Duration of ketamine use (month)	77.56 $\pm$ 36.71	--		
Average daily dose (g)	3.28 $\pm$ 2.71	--		
Frequency of ketamine use weekly	6.15 $\pm$ 1.60	--		
PANSS score				
Positive symptom subscale	7.95 $\pm$ 1.79	--		
Negative symptom subscale	13.11 $\pm$ 3.70	--		
General psychopathology subscale	24.48 $\pm$ 5.02	--		
Total score	45.54 $\pm$ 8.71	--		
BDI score	12.76 $\pm$ 6.48	--		
BAI score	16.11 $\pm$ 10.09	--		

** P < 0.01

Table 2.

Genotype n(%)	KET (n=151)	CON (n=80)	Crude χ^2	P	Crude OR(95%CI)	Adjusted χ^2	P	Adjusted OR(95%CI)
Rs1806201								
TT	53(35.1)	22(27.5)	1.077	0.241	1.426(0.787~2.582)	2.044	0.153	1.824(0.800~4.160)
TC	71(47.0)	34(42.5)	0.431	0.512	1.201(0.695~2.074)	1.113	0.292	1.486(0.712~3.104)
CC ¹	27(17.9)	24(30.0)	4.465	0.035	0.508(0.270~0.958)	8.167	0.004*	0.304(0.134~0.688)

* p < α /3 = 0.05/3.

¹ CC compared with TT & TC.

Adjusted by years of education, alcohol consumption and smoking.

Table 3.

SNP ID	Allele n (%)		Crude χ^2	P	Crude OR(95%CI)	Adjusted χ^2	P	Adjusted OR(95%CI)
Rs1806201	T	C						
KET	177(58.6)	125(41.4)	4.111	0.043*	1.489(1.013~2.189)	6.906	0.009**	2.019(1.196~3.410)
CON	78(48.7)	82(51.3)						

*p<0.05; **P<0.01

Adjusted by years of education, alcohol consumption and smoking.