APOE-controlled effect of inflammatory system gene variants on non-verbal intelligence in young adults

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ABSTRACT:

Although multiple studies indicated the role of APOE gene in cognitive decline, the evidence of APOE effect on genetic associations of inflammatory system genes and cognitive abilities (including non-verbal intelligence, NVI) is scarce. The aim of the study was to estimate the main effect of inflammatory gene variants on individual differences in non-verbal intelligence in mentally healthy students and to clarify the necessity to control for unfavorable APOE E4-alleles while performing genetic testing even at young age. The study included 1011 mentally healthy individuals (80% women; 19.79±1.69 years) of Caucasian origin (535 Russians, 231 Tatars, 160 Udmurts, and 85 of mixed ethnicity) from Russia. NVI score was assessed via Raven’s progressive matrices. The IL1b rs16944, IL1A rs1800587, CRP rs3093077, TNF rs1041981 and rs1800629, P2X7R rs2230912 gene variants were genotyped using PCR. Statistical analysis included multiple linear regression models (additive, dominant, recessive) conducted controlling for sex, ethnicity and APOE E4-allele in total sample and in men and women separately (PLINK v.1.09). While stratifying by APOE E4-allele and controlling for sex and ethnicity in the total sample, there was a significant effect of TNF rs1800629 A-allele (β=1.79; P=0.019), TNF rs1041981 A-allele (β=1.49; P=0.019) and TNF AA-haplotype (rs1041981, rs1800629) (β=1.53; P=0.033) on higher NVI in dominant model. The same effect was observed in men while controlling for APOE E4-allele: TNF rs1800629 A-allele was associated with higher NVI (β=1.75; P=0.021). The findings obtained evidence in a modulating effect of APOE E4-allele on the association between TNF gene variants and non-verbal intelligence in young adults.

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