Association between a functional single nucleotide polymorphism in the brain-derived neurotrophic factor gene and risk of child asthma

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ABSTRACT. Brain-derived neurotrophic factor (*BDNF*) promotes synaptic remodeling and modulates the function of other neurotransmitters. Allergic inflammation triggers neuronal dysfunction and structural changes in the airways. Genetic polymorphisms in functional regions of the *BDNF* gene have a plausible role in modulating the risk of child asthma (CA). This study examined the potential association between CA and three single nucleotide polymorphisms (SNPs) in *BDNF* (rs2030323, rs6265, and rs16917204 in the promoter, exon 4, and 3'-untranslated regions, respectively). The study was conducted in 350 children with asthma and 356 healthy controls. The genotype and allele frequencies and difference between groups were analyzed using HaploView 4.0 and SPSS 20.0 software platforms. The analysis revealed a strong association between the rs6265 genotype distribution and CA. The frequency of the G allele was significantly higher

in CA patients than in healthy controls (P = 0.0007, odds ratio = 1.323, 95% confidence interval = 1.073-1.632). Strong linkage disequilibrium was observed between rs16917204 and rs6265. A significantly higher number of G-G haplotypes were observed in CA patients than in controls (P = 0.024 after Bonferroni correction), while the G-A haplotypes were more significant in controls (P = 0.013 after Bonferroni correction). This suggested that *BDNF* gene polymorphisms confer susceptibility to CA, and also support the notion that BDNF dysfunction is involved in the pathophysiological process of CA.

Key words: Asthma in children; Brain-derived neurotrophic factor; Single nucleotide polymorphisms

