Association of mitochondrial DNA 10398 A/G polymorphism with attention deficit and hyperactivity disorder in Korean children.

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Abstract

Mitochondria are subcellular organelles that contribute to aerobic ATP generation by oxidative phosphorylation (OXPHOS). Previous studies reported that mitochondrial dysfunction and deficiency caused by mitochondrial DNA polymorphisms is associated with various diseases. Especially, mitochondrial DNA 10398 A/G polymorphism is known to affect the regulation of mitochondrial calcium levels related to energy production, and its association with psychiatric disorders such as schizophrenia and bipolar disorder has been reported. However, there are no reports on the genetic relationship between mitochondrial DNA polymorphisms and ADHD. Thus, we evaluated the genetic association between 10398 A/G polymorphism and ADHD in the Korean children. Genotype frequency differences between the case and the control were assessed using Chi-square tests. Independent t-test was used to estimate the effects of genotype on Behavior Assessment System for Children (BASC-2) scales in ADHD children. Our results showed that mitochondrial DNA 10398 A/G polymorphism was significantly associated with the ADHD children (p<0.05). Stratified analyses for gender and subtypes showed a marginal trend toward significance (boys: p=0.059, and combined subtype: p=0.068, respectively). In the BASC-2 analysis, the 10398 A/G polymorphism was significantly associated with aggression behavior and leadership in ADHD boys (p<0.05). These findings suggest that the mitochondrial DNA 10398 A/G polymorphism play a possible role in the genetic etiology of ADHD in Korean children. Larger sample set and functional studies are necessary to further elucidation of our findings.