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The association of catechol-O-methyltransferase (*COMT*) gene variants with childhood attention-deficit/hyperactivity disorder (ADHD)

Nikolac, Matea; Hercigonja Novković, Vesna; Čurković, Mario; Muck-Šeler, Dorotea; Pivac, Nela.

Background: Attention-deficit/hyperactivity disorder (ADHD) is a multifactorial, highly heritable developmental disorder characterized by behavioral symptoms of impulsivity, hyperactivity and/or inattention. The enzyme cathecol-*O*-methyl transferase (COMT), which is responsible for the degradation of catecholamines, could have an important role in genetic susceptibility to ADHD. COMT could play a significant role in modulating dopamine levels in the prefrontal cortex which was implicated in ADHD aetiology. We aimed to analyze the association of *COMT* Val108/158Met (rs4680) polymorphism which affects COMT activity with ADHD features since genetic studies of the functional Val158Met polymorphism in ADHD have been inconsistent.
Methods: The study included 113 medication free children with ADHD diagnosed according to the DSM-IV criteria and 187 children without psychiatric diagnoses and free of medication that served as control group. Genotyping was done using the TaqMan SNP Genotyping Assay.
Results: We found an association between Val108/158Met polymorphism and the symptoms of ADHD in male, but not in female children. Lack of association in female children is probably due to a small number of female patients with ADHD, which represents the limitation of this study. An association with ADHD features was also found when comparing Val carriers to Met/Met homozygotes in male children. These differences were especially significant when comparing male patients with combined type of ADHD with healthy control subjects.
Conclusions: Our results confirmed the association between *COMT* variants and ADHD in male children, which was due to the higher frequency of Met/Met homozygotes in children with ADHD compared to healthy controls. These results suggest that carriers of the high activity COMT variant are less prone to develop ADHD. This study also suggests that *COMT* Val108/158Met polymorphism is associated with the ADHD combined subtype.