

# Associations between Variable Number Tandem Repeat Polymorphism in the Monoamine Oxidase A with Cerebrospinal Fluid Levels in Drug Positive Cases

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## Abstract

**Background:** Monoamine oxidase A (MAOA) plays important roles in the metabolism of catecholamines. The MAOA gene is located on the X chromosome, and a polymorphic promoter variable number tandem repeat (VNTR) locus (MAOA-uVNTR) is located approximately 1.2 kb upstream from MAOA exon 1. Functional studies have revealed that MAOA-uVNTR affects MAOA gene expression.

**Aims:** The associations between MAOA-uVNTR polymorphism and cerebrospinal fluid (CSF) catecholamine concentrations were investigated in autopsy cases in which drugs were detected.

**Methods:** We examined the frequencies of MAOA-uVNTR alleles in 89 autopsy cases in which psychotropic drugs were detected (PD

cases) and 26 autopsy cases in which methamphetamine was detected (MA cases). CSF adrenaline (Adr), noradrenaline (Nad), or dopamine (DA) levels were analyzed in these cases.

**Results:** In male PD and MA cases, no significant associations between MAOA-uVNTR polymorphism and CSF Adr, Nad, or DA levels were found. In female PD cases, no significant associations between MAOA-uVNTR polymorphism and CSF Nad or DA levels were found. In contrast, female PD cases who were homozygous for the 3-repeat allele (i.e., 3/3 genotype carriers) had higher CSF levels of Adr than individuals who were heterozygous or homozygous for the 4-repeat allele (3/4 and 4/4,

respectively) ( $p = 0.028$ ).

**Conclusion:** The results of the present study suggest that MAOA-uVNTR polymorphism influences CSF Adr levels in female PD cases.

**Keywords:** Psychotropic drugs, Methamphetamine, Monoamine oxidase A, VNTR polymorphism, Catecholamine