Alkylglycerol Monooxygenase

Alternative Names
AGMO
Glyceryl-Ether Monooxygenase
Transmembrane Protein 195: TMEM195

Record Category
Gene locus

WHO-ICD
N.B.: Classification not applicable to gene loci.

Incidence per 100,000 Live Births
N/A to gene loci

OMIM Number
613738

Mode of Inheritance

Gene Map Locus
7p21.2

Description

The AGMO gene, also known as TMEM195, codes for a tetrahydrobiopterin-dependent enzyme, called Alkylglycerol Monooxygenase, that cleaves the ether bond of alkylglycerols. Alkylglycerols are a specific subclass of ether lipids that play an essential role in structural brain development, spermatogenesis, immune mediation, and cell signaling, among other things. Alkylglycerol monooxygenase is the only enzyme known to carry out the hydrolysis of alkylglycerols. The exact reaction carried out by the enzyme involves the conversion of 1-alkyl-sn-glycerol to 1-hydroxyalkyl-sn-glycerol in a reaction aided by tetrahydrobiopterin.

Genome-wide association data indicated that variants in AGMO are associated with conditions such as diabetes, congenital heart disease, and autism. Recent studies have also shown mutations in this gene to be causal for a syndromic form of Primary Microcephaly.

Molecular Genetics
The AGMO gene is located on the short arm of chromosome 7. With its 13 exons, the gene spans a length of 402 Kb. The encoded protein has a size of about 51 kDa and consists of 445 amino acids. It is localized mainly within the ER membrane.

The AGMO enzyme shares little homology with the other known tetrahydrobiopterin-dependent enzymes. However, like other membrane bound hydrolyzing proteins, AGMO contains a fatty acid hydroxylase motif. This motif is characterized by the presence of eight conserved histidine residues that interact with a di-iron center. The active site of the enzyme is predicted to be formed by the clustering of five of the eight histidine residues and a critical glutamate residue involved in tetrahydrobiopterin binding.

Epidemiology in the Arab World

Saudi Arabia

AlRayes et al., (2016) studied a consanguineous Saudi family in which two affected siblings presented with primary microcephaly, developmental delay, short stature and intellectual disability. A homozygous block was identified through genome-wide single nucleotide polymorphism microarray genotyping. Following this, whole exome sequencing identified a novel homozygous deletion (c.967delA; p.Glu324Lysfs12*) in exon 10 of the AGMO gene. This was the first report indicating that a mutation in the AGMO gene causes primary microcephaly in humans.

References
Alrayes N, Mohamoud HS, Ahmed S, Almramhi MM, Shuaib TM, Wang J, Al-Aama JY, Everett K, Nasir J, Jelani M. The alkylglycerol monooxygenase (AGMO) gene previously involved in autism also causes a novel syndromic form of primary microcephaly in a consanguineous Saudi family. J Neurol Sci. 2016; 363:240-4. PMID: 27000257.

Related CTGA Records

External Links

https://www.genecards.org/cgi-bin/carddisp.pl?gene=AGMO
https://www.ncbi.nlm.nih.gov/gene/392636

Contributors
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