Component of Oligomeric Golgi Complex 6

Alternative Names
COG6
KIAA1134
COD2, S. Cerevisiae, Homolog Of
COD2

Record Category
Gene locus

WHO-ICD
N/A to gene loci

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

OMIM Number
606977

Mode of Inheritance
N/A to gene loci

Gene Map Locus
13q14.11

Description
The Conserved Oligomeric Golgi (COG) complex is a hetero-octameric peripheral Golgi protein complex that is believed to play a role in maintaining the structure and function of the Golgi apparatus. It appears to be involved in intra-Golgi vesicle-mediated transport, endoplasmic reticulum to Golgi vesicle-mediated anterograde transport and the regulation of endosome to trans-Golgi network (TGN) retrograde trafficking. It is also involved in glycosylation through the trafficking of glycosyltransferases.

While the exact mechanism by which the COG complex mediates its functions is unclear, recent studies have highlighted the role of a subunit named COG6. This subunit, located in lobe B of the complex, is encoded by the COG6 gene and allows the complex to interact directly with target membrane SNARE Syntaxin 6. Depletion of mouse *Cog6* in cells leads to a reduction in the steady-state level of Syntaxin 6 and significantly diminishes endosome to TGN transport.

Defects in the COG6 gene can thus have strong pathological consequences. Homozygous COG6 mutations have been implicated in Congenital Disorder of Glycosylation, type Ill (CDG2L) and Shaheen Syndrome.

Molecular Genetics
The COG6 gene is located on the long arm of chromosome 13. It spans a length of 136 kb of DNA and its coding sequence is contained within 22 exons. The protein product encoded by this gene has a molecular mass of 73.2 kDa and consists of 657 amino acids. The gene is found to be expressed in the brain, ovary, bone and skin. A genotype-phenotype correlation exists wherein deep intronic mutations result in the mildest form of Shaheen syndrome while loss-of-function variants can cause lethal forms of CDGIIL. Examples of COG6 mutations include the deep intronic splicing variant c.1167–24A>G implicated in Shaheen syndrome and the missense variant p.Gly549Val associated with CDGIIL.

Epidemiology in the Arab World
Saudi Arabia
Monies et al. (2017) examined the findings of 1000 diagnostic panels and exomes carried out at a next generation sequencing lab in Saudi Arabia. One patient, a 1-year-old male, suffered from a failure to thrive, global developmental delay, hiatus hernia, lung hypoplasia, congenital diaphragmatic hernia, low intestinal motility disorder and partial intestinal obstruction. Using a multigene panel for neurological disorders, a homozygous deep intronic mutation (chr13:40273614) was identified in the patient's COG6 gene, associated with Shaheen

Syndrome. Given the atypical presentation of the patient, this case helped in the phenotypic expansion of the disorder.

References

Monies D, Abouelhoda M, AlSayed M, Alhassnan Z, Alotaibi M, Kayyali H, Al-Owain M, Shah A, Rahbeeni Z, Al-Muhaizea MA, Alzaidan HI, Cupler E, Bohlega S, Faqeih E, Faden M, Alyounes B, Jaroudi D, Goljan E, Elbardisy H, Akilan A, Albar R, Aldhalaan H, Gulab S, Chedrawi A, Al Saud BK, Kurdi W, Makhseed N, Alqasim T, El Khashab HY, Al-Mousa H, Alhashem A, Kanaan I, Algoufi T, Alsaleem K, Basha TA, Al-Murshedi F, Khan S, Al-Kindy A, Alnemer M, Al-Hajjar S, Alyamani S, Aldhekri H, Al-Mehaidib A, Arnaout R, Dabbagh O, Shagrani M, Broering D, Tulbah M, Alqassmi A, Almugbel M, AlQuaiz M, Alsaman A, Al-Thihli K, Sulaiman RA, Al-Dekhail W, Alsaegh A, Bashiri FA, Qari A, Alhomadi S, Alkuraya H, Alsebayel M, Hamad MH, Szonyi L, Abaalkhail F, Al-Mayouf SM, Almojalli H, Alqadi KS, Elsiesy H, Shuaib TM, Seidahmed MZ, Abosoudah I, Akleh H, AlGhonaium A, Alkharfy TM, Al Mutairi F, Eyaid W, Alshanbary A, Sheikh FR, Alsohaibani FI, Alsonbul A, Al Tala S, Balkhy S, Bassiouni R, Alenizi AS, Hussein MH, Hassan S, Khalil M, Tabarki B, Alshahwan S, Oshi A, Sabr Y, Alsaadoun S, Salih MA, Mohamed S, Sultana H, Tamim A, El-Haj M, Alshahrani S, Bubshait DK, Alfadhel M, Faquih T, El-Kalioby M, Subhani S, Shah Z, Moghrabi N, Meyer BF, Alkuraya FS. The landscape of genetic diseases in Saudi Arabia based on the first 1000 diagnostic panels and exomes. Hum Genet. 2017 Aug;136(8):921-939. PMID: 28600779.

Related CTGA Records

Shaheen Syndrome (OMIM 615328)

External Links

http://www.genecards.org/cgi-bin/carddisp.pl?gene=COG6

Contributors

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