MED12 Related Disorders

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MED12 gene

MED12 gene

mediator complex subunit 12

Normal Function

The MED12 gene provides instructions for making a protein called mediator complex subunit 12. As its name suggests, this protein forms one part (subunit) of the mediator complex, which is a group of about 25 proteins that work together to regulate gene activity. The mediator complex physically links transcription factors, which are proteins that influence whether genes are turned on or off, with an enzyme called RNA polymerase II. Once transcription factors are attached, this enzyme initiates gene transcription, the process by which information stored in a gene's DNA is used to build proteins.Researchers believe that the MED12 protein is involved in many aspects of early development, including the development of nerve cells (neurons) in the brain. The MED12 protein is part of several chemical signaling pathways within cells. These pathways help direct a broad range of cellular activities, such as cell growth, cell movement (migration), and the process by which cells mature to carry out specific functions (differentiation).

Health Conditions Related to Genetic Changes

FG syndrome

At least two mutations in the MED12 gene have been found to cause FG syndrome, which is characterized by intellectual disability, behavioral problems, and physical abnormalities including weak muscle tone (hypotonia) and obstruction of the anal opening (imperforate anus).The mutations that cause FG syndrome each change a single protein building block (amino acid) in the MED12 protein. One mutation replaces the amino acid arginine with the amino acid tryptophan at protein position 961 (written as Arg961Trp or R961W). The other replaces the amino acid glycine with the amino acid glutamic acid at protein position 958 (written as Gly958Glu or G958E). These mutations alter the structure of the MED12 protein, which likely disrupts its ability to regulate gene activity during development. However, it is unclear how the genetic changes lead to intellectual disability and the other features of FG syndrome.

More About This Health Condition

Lujan syndrome

At least one mutation in the MED12 gene causes Lujan syndrome, a disorder characterized by intellectual disability, behavioral problems, and physical features including tall stature and a long, narrow face. This mutation is different than the genetic changes associated with FG syndrome (described above); the Lujan syndrome mutation replaces the amino acid asparagine with the amino acid serine at position 1007 of the MED12 protein (written as Asn1007Ser or N1007S). The mutation

alters the structure of the MED12 protein and likely disrupts its ability to regulate gene activity, but it is not known how these changes affect development and lead to the specific features of Lujan syndrome.

More About This Health Condition

Ohdo syndrome, Maat-Kievit-Brunner type

At least three MED12 gene mutations have been found to cause the Maat-Kievit-Brunner type of Ohdo syndrome, which is a rare condition characterized by intellectual disability and distinctive facial features. The mutations that cause this disorder change single amino acids in the MED12 gene, although they are not the same genetic changes that cause FG syndrome or Lujan syndrome (described above). The mutations that result in the Maat-Kievit-Brunner type of Ohdo syndrome change the structure of the MED12 gene, impairing its ability to control gene activity. It is unclear how these changes lead to the particular cognitive and physical features of the disorder.

More About This Health Condition

Prostate cancer

MedlinePlus Genetics provides information about Prostate cancer

More About This Health Condition

Tumors

Some gene mutations are acquired during a person's lifetime and are present only in certain cells. These changes, which are known as somatic mutations, are not inherited. Somatic mutations in the MED12 gene have been found in several types of tumors, both noncancerous and cancerous.Somatic MED12 gene mutations are present in most uterine leiomyomas, which are noncancerous growths also known as uterine fibroids. Uterine leiomyomas are common in adult women. These growths can cause pelvic pain and abnormal bleeding, and, in some cases, lead to an inability to have biological children (infertility). Somatic MED12 gene mutations have also been identified in some cancerous uterine tumors, including leiomyosarcomas and smooth muscle tumors of uncertain malignant potential (STUMP), and in some prostate and colorectal cancers.Studies suggest that somatic MED12 gene mutations alter the function of the MED12 protein, which likely disrupts normal cell signaling and impairs regulation of cell growth and other cell functions. As a result, certain cells may become able to divide in an uncontrolled way, leading to the growth of a tumor.

Other Names for This Gene

CAGH45 HOPA KIAA0192 MED12_HUMAN mediator of RNA polymerase II transcription, subunit 12 homolog OKS OPA-containing protein OPA1 thyroid hormone receptor-associated protein, 230 kDa subunit TNRC11 TRAP230

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

Tests of MED12

Scientific Articles on PubMed

PubMed

Catalog of Genes and Diseases from OMIM

MEDIATOR COMPLEX SUBUNIT 12; MED12

Gene and Variant Databases

NCBI Gene

ClinVar

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Genomic LocationThe MED12 gene is found on the X chromosome.

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