



AFF4 gene

AF4/FMR2 family member 4

Normal Function

The *AFF4* gene provides instructions for making part of a protein complex called the super elongation complex (SEC). During embryonic development, the SEC is involved in an activity called transcription, which is the first step in the production of proteins from genes. By re-starting the transcription of certain genes after pauses that normally occur during the process, the SEC helps ensure that development proceeds appropriately before birth.

Health Conditions Related to Genetic Changes

CHOPS syndrome

Mutations in the *AFF4* gene cause CHOPS syndrome, a disorder involving multiple abnormalities that are present from birth (congenital). The name "CHOPS" is an abbreviation for a list of features of the disorder including cognitive impairment, coarse facial features, heart defects, obesity, lung (pulmonary) involvement, short stature, and skeletal abnormalities.

The *AFF4* gene mutations identified in people with CHOPS syndrome change single protein building blocks (amino acids) in the *AFF4* protein. These mutations are thought to result in an *AFF4* protein that is not broken down when it is no longer needed, so more *AFF4* protein is available than usual. The excess *AFF4* protein interferes with normal pauses in transcription. This dysregulation of transcription leads to problems in the development of multiple organs and tissues, resulting in the signs and symptoms of CHOPS syndrome.

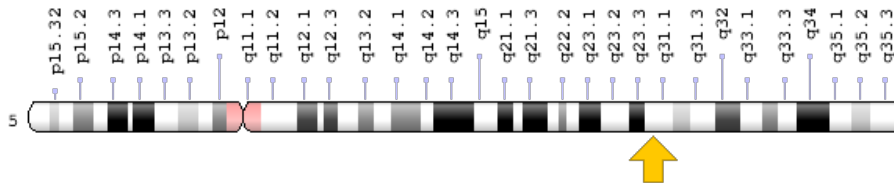
Cancers

The *AFF4* gene is occasionally involved in chromosomal rearrangements (translocations) that are found in certain blood cancers called infant acute lymphoblastic leukemia and mixed lineage leukemia. The translocations fuse the *AFF4* gene with another gene called *KMT2A* (formerly known as *MLL*). The fusion gene provides instructions for making an abnormal protein that combines features of the proteins produced from *AFF4* and *KMT2A*. The abnormal protein likely disrupts the transcription elongation function of the SEC, which alters normal gene activity (expression) and results in the uncontrolled growth of cells that occurs in leukemia. Researchers are working to determine the specific effects of the abnormalities and how they lead to these particular cancers.

Chromosomal Location

Cytogenetic Location: 5q31.1, which is the long (q) arm of chromosome 5 at position 31.1

Molecular Location: base pairs 132,875,381 to 132,963,655 on chromosome 5 (Homo sapiens Updated Annotation Release 109.20190905, GRCh38.p13) (NCBI)



Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- AF4/FMR2 family, member 4
- AF5Q31
- ALL1-fused gene from chromosome 5q31 protein
- major CDK9 elongation factor-associated protein
- MCEF

Additional Information & Resources

Educational Resources

- Molecular Biology of the Cell (fourth edition, 2002): Transcription Elongation Produces Superhelical Tension in DNA
<https://www.ncbi.nlm.nih.gov/books/NBK26887/#A1005>

Scientific Articles on PubMed

- PubMed
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28AFF4%5BTIAB%5D%29+OR+%28AF4/FMR2+family,+member+4%5BTIAB%5D%29%29+OR+%28%28AF4/FMR2+family+member+4%5BTIAB%5D%29+OR+%28AF5Q31%5BTIAB%5D%29+OR+%28ALL1-fused+gene+from+chromosome+5q31+protein%5BTIAB%5D%29+OR+%28CHOPS%5BTIAB%5D%29+OR+%28MCEF%5BTIAB%5D%29+OR+%28major+CDK9+elongation+factor-associated+protein%5BTIAB%5D%29%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+2160+days%22%5Bdp%5D>

Catalog of Genes and Diseases from OMIM

- AF4/FMR2 FAMILY, MEMBER 4
<http://omim.org/entry/604417>

Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology
<http://atlasgeneticsoncology.org/Genes/AF5q31ID230.html>
- ClinVar
<https://www.ncbi.nlm.nih.gov/clinvar?term=AFF4%5Bgene%5D>
- HGNC Gene Symbol Report
https://www.genenames.org/data/gene-symbol-report#!/hgnc_id/HGNC:17869
- Monarch Initiative
<https://monarchinitiative.org/gene/NCBIGene:27125>
- NCBI Gene
<https://www.ncbi.nlm.nih.gov/gene/27125>
- UniProt
<https://www.uniprot.org/uniprot/Q9UHB7>

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