MIR17HG gene

miR-17-92a-1 cluster host gene

Normal Function

The *MIR17HG* gene provides instructions for making the miR-17~92 microRNA (miRNA) cluster. MiRNAs are short pieces of RNA, a chemical cousin of DNA. These molecules control gene expression by blocking protein production. The miR-17~92 cluster includes six miRNAs: miR-17, miR-18a, miR-19a, miR-19b-1, miR-20a, and miR-92a-1. MiRNAs in this cluster control the expression of hundreds of genes. These miRNAs help regulate signaling pathways that direct several cellular processes involved in growth and development, including cell growth and division (proliferation), cell maturation (differentiation), and the self-destruction of cells (apoptosis). Studies suggest that the miR-17~92 cluster is necessary for normal development of the skeleton, heart, kidneys, lungs, and nervous system.

The *MIR17HG* gene belongs to a class of genes known as oncogenes. When mutated, oncogenes have the potential to cause normal cells to become cancerous.

Health Conditions Related to Genetic Changes

Feingold syndrome

Genetic changes that reduce the amount of the *MIR17HG* gene cause Feingold syndrome type 2. This developmental disorder is characterized by abnormalities of the fingers and toes, particularly shortening of the second and fifth fingers (brachymesophalangy). Other common features include an unusually small head size (microcephaly) and learning disabilities. The mutations involved in this condition, known as 13q31.3 microdeletions, remove (delete) a small region of chromosome 13 that includes the *MIR17HG* gene and sometimes part or all of other nearby genes. Loss of the *MIR17HG* gene is thought to underlie the characteristic features of the disorder, although loss of other genes may play a role in some cases.

Deletion of one copy of the *MIR17HG* gene reduces the amount of miR-17~92 cluster miRNAs available to control the activity of specific genes during development before birth. While it is likely that the resulting disruption of signaling pathways leads to the problems with growth and development characteristic of Feingold syndrome type 2, it remains unclear exactly how a shortage of miR-17~92 cluster miRNAs causes the specific features of the condition.

Cancers

Genetic changes that result in extra copies of the *MIR17HG* gene have been found in cancer. These genetic changes likely occur when DNA makes a copy of itself

(replicates) in preparation for cell division. Errors in the replication process can result in one or more extra copies of a gene within a cell, which is known as gene amplification. The amplifications are somatic, which means they are not inherited but instead occur in cells that give rise to the tumor. Gene amplifications involving *MIR17HG* have been found in a cancer of immune system cells called diffuse large B-cell lymphoma. Such amplifications are thought to increase the amount of miR-17~92 miRNAs. The resulting alterations to cell signaling pathways may lead to too much cell proliferation or too little apoptosis. As a result, cells can grow and divide uncontrollably, leading to the development of cancer.

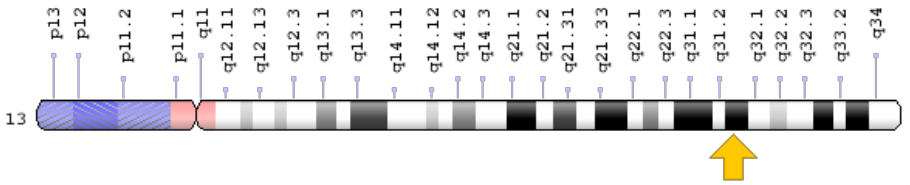
Other disorders

Genetic changes, called microduplications, that result in an extra copy of the *MIR17HG* gene have been associated with developmental problems in a small number of people. Some individuals with these microduplications have overgrowth of the skeleton, resulting in extra fingers (polydactyly) and an unusually large head size (macrocephaly). Others with these microduplications have impaired growth, leading to short fingers (brachydactyly) and short stature. Affected individuals may also have features of autism spectrum disorder, which is characterized by impaired communication and social interaction. Researchers suggest that an extra copy of the *MIR17HG* gene disrupts normal skeletal growth, although they are unsure why the microduplications can either increase or reduce growth.

Chromosomal Location

Cytogenetic Location: 13q31.3, which is the long (q) arm of chromosome 13 at position 31.3

Molecular Location: base pairs 91,347,820 to 91,354,575 on chromosome 13 (Homo sapiens Updated Annotation Release 109.20190607, GRCh38.p13) (NCBI)



Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- C13orf25
- FGLDS2
- FLJ14178

- LINC00048
- MIHG1
- miR-17-92
- MIRH1
- MIRHG1
- NCRNA00048

Additional Information & Resources

Educational Resources

- Stembook (2008): MicroRNA Biogenesis and Function
  https://www.ncbi.nlm.nih.gov/books/NBK27061/#theroleof micrornasingermline.sec1-3

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28MIR17HG%5BTIAB%5D %29+OR+%28miR-17-92a-1+cluster+host+gene%5BTIAB%5D%29%29+OR +%28%28C13orf25%5BTIAB%5D%29+OR+%28FGLDS2%5BTIAB%5D %29+OR+%28MIRHG1%5BTIAB%5D%29+OR+%28miR-17-92%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+720+days%22%5Bdp%5D

Catalog of Genes and Diseases from OMIM

- MICRO RNA 17 HOST GENE
  http://omim.org/entry/609415

Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology
  http://atlasgeneticsoncology.org/Genes/GC_MIR17HG.html
- ClinVar
  https://www.ncbi.nlm.nih.gov/clinvar?term=MIR17HG%5Bgene%5D
- HGNC Gene Symbol Report
  https://www.genenames.org/data/gene-symbol-report/#!/hgnc_id/HGNC:23564
- Monarch Initiative
  https://monarchinitiative.org/gene/NCBIGene:407975
- NCBI Gene
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