MIR145 gene

microRNA 145

Normal Function

The *MIR145* gene provides instructions for making microRNA-145 (miR-145). MicroRNAs (miRNAs) are short lengths of RNA, a chemical cousin of DNA. These molecules control gene expression by blocking the process of protein production. MiR-145 is abundant in immature blood cells and controls the expression of hundreds of genes. This microRNA is thought to be involved in normal blood cell development. In particular, miR-145 appears to play a role in the growth and division of blood cells called megakaryocytes, which produce platelets, the cell fragments involved in blood clotting.

Health Conditions Related to Genetic Changes

5q minus syndrome

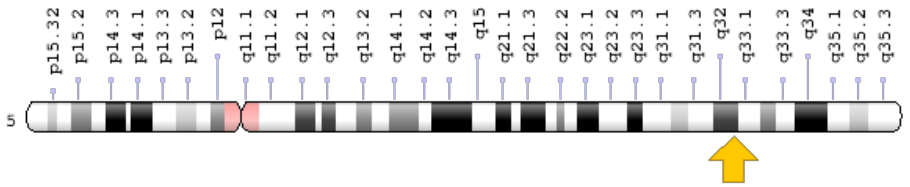
The *MIR145* gene is involved in a condition called 5q minus (5q-) syndrome. This condition is a type of bone marrow disorder called myelodysplastic syndrome (MDS), in which immature blood cells fail to develop normally. Individuals with 5q- syndrome often have a shortage of red blood cells (anemia) and abnormalities in megakaryocytes. Affected individuals also have an increased risk of developing a fast-growing blood cancer known as acute myeloid leukemia (AML).

5q- syndrome is caused by deletion of a region of DNA from the long (q) arm of chromosome 5. This deletion occurs in immature blood cells during a person's lifetime and affects one copy of chromosome 5 in each cell. Most people with 5q- syndrome are missing a sequence of about 1.5 million DNA building blocks (base pairs), also written as 1.5 megabases (Mb). This deleted region contains 40 genes, including *MIR145*. Loss of one copy of the *MIR145* gene reduces the amount of the microRNA miR-145 in cells. As a result, levels of proteins whose production is normally blocked by miR-145 are elevated, which leads to the abnormal development of megakaryocytes that occurs in 5q- syndrome. Research suggests that the other features of the condition are associated with other genes in the deleted segment of DNA.

Chromosomal Location

Cytogenetic Location: 5q32, which is the long (q) arm of chromosome 5 at position 32

Molecular Location: base pairs 149,430,646 to 149,430,733 on chromosome 5 (Homo sapiens Updated Annotation Release 109.20190607, GRCh38.p13) (NCBI)



Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- hsa-mir-145
- miR-145
- MIRN145
- miRNA145

Additional Information & Resources

Educational Resources

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

Scientific Articles on PubMed

- PubMed https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28MIR145%5BTIAB%5D%29+OR+%28microRNA+145%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+1080+days%22%5Bdp%5D

Catalog of Genes and Diseases from OMIM

- MICRO RNA 145 http://omim.org/entry/611795

Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology
  http://atlasgeneticsoncology.org/Genes/MIR145ID50927ch5q32.html
- HGNC Gene Symbol Report
  https://www.genenames.org/data/gene-symbol-report/#!/hgnc_id/HGNC:31532
- Monarch Initiative
  https://monarchinitiative.org/gene/NCBIGene:406937
- NCBI Gene
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