

FIP1L1 gene

factor interacting with PAPOLA and CPSF1

Normal Function

The *FIP1L1* gene provides instructions for making part of a protein complex named cleavage and polyadenylation specificity factor (CPSF). This complex of proteins plays an important role in processing molecules called messenger RNAs (mRNAs), which serve as the genetic blueprints for making proteins. The CPSF protein complex helps add a string of the RNA building block adenine to the mRNA, creating a polyadenine tail or poly(A) tail. The poly(A) tail is important for stability of the mRNA and for protein production from the blueprint.

Health Conditions Related to Genetic Changes

PDGFRA-associated chronic eosinophilic leukemia

A deletion of genetic material from chromosome 4 brings together part of the *FIP1L1* gene and part of another gene called *PDGFRA*, creating the *FIP1L1-PDGFRA* fusion gene. This mutation is a somatic mutation, which means it is acquired during a person's lifetime and is present only in certain cells. This fusion gene causes *PDGFRA*-associated chronic eosinophilic leukemia, which is a type of blood cell cancer characterized by an increased number of eosinophils, a type of white blood cell involved in allergic reactions.

The FIP1L1-PDGFRA protein produced from the fusion gene has the function of the normal PDGFRA protein, which stimulates signaling pathways inside the cell that control many important cellular processes, such as cell growth and division (proliferation) and cell survival. Unlike the normal PDGFRA protein, however, the FIP1L1-PDGFRA protein is constantly turned on (constitutively activated), which means the cells are always receiving signals to proliferate. When the *FIP1L1-PDGFRA* fusion gene occurs in blood cell precursors, the growth of eosinophils (and occasionally other blood cells) is poorly controlled, leading to *PDGFRA*-associated chronic eosinophilic leukemia. It is unclear why eosinophils are preferentially affected by this genetic change.

Other Names for This Gene

- FIP1-like 1 protein
- FIP1_HUMAN

- hFip1
- pre-mRNA 3'-end-processing factor FIP1
- Rhe

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of FIP1L1 ([https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=81608\[geneid\]](https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=81608[geneid]))

Scientific Articles on PubMed

- PubMed (<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28FIP1L1%5BTIAB%5D%29+OR+%28FIP1+like+1%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+1440+days%22%5Bdp%5D%29%29%29>)

Catalog of Genes and Diseases from OMIM

- FIP1-LIKE 1; FIP1L1 (<https://omim.org/entry/607686>)

Gene and Variant Databases

- NCBI Gene (<https://www.ncbi.nlm.nih.gov/gene/81608>)
- ClinVar ([https://www.ncbi.nlm.nih.gov/clinvar?term=FIP1L1\[gene\]](https://www.ncbi.nlm.nih.gov/clinvar?term=FIP1L1[gene]))

References

- Bain BJ. Relationship between idiopathic hypereosinophilic syndrome, eosinophilic leukemia, and systemic mastocytosis. *Am J Hematol.* 2004 Sep; 77(1):82-5. doi: 10.1002/ajh.20088. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/15307112>)
- Buitenhuis M, Verhagen LP, Cools J, Coffey PJ. Molecular mechanisms underlying FIP1L1-PDGFR α -mediated myeloproliferation. *Cancer Res.* 2007 Apr 15; 67(8):3759-66. doi: 10.1158/0008-5472.CAN-06-4183. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/17440089>)
- Cools J, DeAngelo DJ, Gotlib J, Stover EH, Legare RD, Cortes J, Kutok J, Clark J, Galinsky I, Griffin JD, Cross NC, Tefferi A, Malone J, Alam R, Schrier SL, Schmid J, Rose M, Vandenberghe P, Verhoef G, Boogaerts M, Wlodarska I, Kantarjian H, Marynen P, Coutre SE, Stone R, Gilliland DG. A tyrosine kinase created by fusion of the PDGFR α and FIP1L1 genes as a therapeutic target of imatinib in idiopathic hypereosinophilic syndrome. *N Engl J Med.* 2003 Mar 27; 348(13):1201-14. doi: 10.1056/NEJMoa025217. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/126603>)

84)

- Fukushima K, Matsumura I, Ezoe S, Tokunaga M, Yasumi M, Satoh Y, Shibayama H, Tanaka H, Iwama A, Kanakura Y. FIP1L1-PDGFRalpha imposes eosinophil lineage commitment on hematopoietic stem/progenitor cells. J Biol Chem. 2009 Mar 20;284(12):7719-32. doi: 10.1074/jbc.M807489200. Epub 2009 Jan 14. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/19147501>) or Free article on PubMed Central (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2658066/>)
- Kaufmann I, Martin G, Friedlein A, Langen H, Keller W. Human Fip1 is a subunit of CPSF that binds to U-rich RNA elements and stimulates poly(A) polymerase. EMBO J. 2004 Feb 11;23(3):616-26. doi: 10.1038/sj.emboj.7600070. Epub 2004 Jan 29. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/14749727>) or Free article on PubMed Central (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1271804/>)
- Roufosse FE, Goldman M, Cogan E. Hypereosinophilic syndromes. Orphanet J Rare Dis. 2007 Sep 11;2:37. doi: 10.1186/1750-1172-2-37. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/17848188>) or Free article on PubMed Central (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2045078/>)

Genomic Location

The *FIP1L1* gene is found on chromosome 4 (<https://medlineplus.gov/genetics/chromosome/4/>).

Last updated February 1, 2012