

ETV6 Gene

Subjects: Genetics & Heredity

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ETS variant 6

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1. Normal Function

The *ETV6* gene provides instructions for producing a protein that functions as a transcription factor, which means that it attaches (binds) to specific regions of DNA and controls the activity of certain genes. The ETV6 protein is found in the nucleus of cells throughout the body, where it turns off (represses) gene activity. It plays a key role in development before birth and in regulating blood cell formation.

2. Health Conditions Related to Genetic Changes

2.1 PDGFRB-Associated Chronic Eosinophilic Leukemia

PDGFRB-associated chronic eosinophilic leukemia, a type of cancer of blood-forming cells, can be caused by a genetic rearrangement known as a translocation that brings together part of the *ETV6* gene and part of another gene called *PDGFRB*, creating the *ETV6-PDGFRB* fusion gene. The translocation that leads to the *ETV6-PDGFRB* fusion gene is a somatic mutation, which is acquired during a person's lifetime and occurs initially in a single cell. This cell continues to grow and divide, producing a group of cells with the same mutation (a clonal population).

The protein produced from the *ETV6-PDGFRB* fusion gene, called ETV6/PDGFR β , functions differently than the proteins normally produced from the individual genes. Unlike the normal PDGFR β protein, the fusion protein is always active, which means certain cell signaling pathways are constantly turned on. The fusion protein is unable to repress gene activity regulated by the normal ETV6 protein, so gene activity is increased. The overactive signaling pathways and abnormal gene activity increase the proliferation and survival of cells. When the *ETV6-PDGFRB* fusion gene mutation occurs in cells that develop into blood cells, the growth of white blood cells called eosinophils (and occasionally other white blood cells, such as neutrophils and mast cells) is poorly controlled, leading to *PDGFRB*-associated chronic eosinophilic leukemia. It is unclear why eosinophils are preferentially affected by this genetic change.

2.2 Other Cancers

Translocations involving the *ETV6* gene and more than 30 other genes have been found to cause different types of leukemia, including acute myeloid leukemia (AML) and acute lymphoblastic leukemia (ALL), and a bone marrow disease called myelodysplastic syndrome (MDS). Depending on the gene fused with *ETV6*, a number of mechanisms can cause these conditions, such as impaired regulation of gene activity, abnormal signaling, or loss of normal gene function. The *ETV6* gene translocations that cause these diseases are somatic mutations and are not inherited.

3. Other Names for This Gene

- ETS translocation variant 6
- ets variant 6
- ets variant gene 6 (TEL oncogene)
- ETS-related protein Tel1
- ETV6_HUMAN

- TEL
 - TEL1 oncogene
 - transcription factor ETV6
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References

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