FZD4 gene

frizzled class receptor 4

Normal Function

The *FZD4* gene provides instructions for making a protein called frizzled-4. This protein is embedded in the outer membrane of many types of cells, where it is involved in transmitting chemical signals from outside the cell to the cell's nucleus. Specifically, frizzled-4 participates in the Wnt signaling pathway, a series of steps that affect the way cells and tissues develop. Wnt signaling is important for cell division (proliferation), attachment of cells to one another (adhesion), cell movement (migration), and many other cellular activities.

Studies suggest that, at the cell surface, the frizzled-4 protein interacts with a protein called norrin (produced from the *NDP* gene). The two proteins fit together like a key in a lock. Researchers suspect that when norrin attaches (binds) to frizzled-4, it initiates a multi-step process that regulates the activity of certain genes. During early development, signaling by norrin and frizzled-4 plays a critical role in the specialization of cells in the retina, which is the light-sensitive tissue that lines the back of the eye. This signaling pathway is also involved in the formation of blood vessels in the retina and in the inner ear.

Health Conditions Related to Genetic Changes

Familial exudative vitreoretinopathy

Variants (also called mutations) in the *FZD4* gene have been identified in people with an eye disorder called familial exudative vitreoretinopathy. This disorder affects the retina and can cause vision loss that worsens over time. Some of these variants change single protein building blocks (amino acids) in frizzled-4, while others insert or delete genetic material in the *FZD4* gene. Most *FZD4* gene variants reduce the amount of frizzled-4 that is produced within cells. Other variants are thought to result in the production of an unstable protein that cannot bind to norrin.

A reduction in the amount of frizzled-4 disrupts chemical signaling in the developing eye, which interferes with the formation of blood vessels at the edges of the retina. The resulting abnormal blood supply to this tissue can lead to retinal damage and vision loss in people with familial exudative vitreoretinopathy.

Other Names for This Gene

- CD344
- EVR1
- FEVR
- frizzled 4
- frizzled family receptor 4
- frizzled homolog 4 (Drosophila)
- Fz-4
- FZD4_HUMAN
- FZD4S
- FzE4
- GPCR
- MGC34390
- WNT receptor frizzled-4

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of FZD4 (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=8322[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28%28FZD4%5BTIAB%5D%29+OR+%28frizzled+4%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+1800+days%22%5Bdp%5D)

Catalog of Genes and Diseases from OMIM

- FRIZZLED CLASS RECEPTOR 4; FZD4 (https://omim.org/entry/604579)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/8322)
- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=FZD4[gene])

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Genomic Location

The *FZD4* gene is found on chromosome 11 (https://medlineplus.gov/genetics/chromosome/11/).

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