FLCN gene

folliculin

Normal Function

The *FLCN* gene provides instructions for making a protein called folliculin. Researchers have not determined the protein's function, but they believe it may act as a tumor suppressor. Tumor suppressors help control the growth and division of cells.

The folliculin protein is present in many of the body's tissues, including the brain, heart, placenta, testis, skin, lung, and kidney. Researchers have proposed several possible roles for the protein within cells. Folliculin may be important for cells' uptake of foreign particles (endocytosis or phagocytosis). The protein may also play a role in the structural framework that helps to define the shape, size, and movement of a cell (the cytoskeleton) and in interactions between cells. In the lung, it is thought that folliculin plays a role in repairing and re-forming lung tissue following damage.

Health Conditions Related to Genetic Changes

Birt-Hogg-Dubé syndrome

Several mutations in the *FLCN* gene have been identified in people with Birt-Hogg-Dubé syndrome, a condition characterized by multiple noncancerous (benign) skin tumors, an increased risk of other tumors, and lung cysts. Most of these mutations insert or delete one or more protein building blocks (amino acids) in the folliculin protein. These mutations lead to the production of an abnormally small, nonfunctional version of this protein. Without folliculin, researchers believe that cells can grow and divide uncontrollably to form cancerous or noncancerous tumors. They have not determined how a loss of folliculin increases the risk of lung abnormalities that are often associated with Birt-Hogg-Dubé syndrome.

Primary spontaneous pneumothorax

At least eight mutations in the *FLCN* gene have been found to cause primary spontaneous pneumothorax. This condition occurs when air builds up abnormally in the space between the lungs and the chest cavity (plural space), potentially leading to a partial or complete collapse of the lung. Many of these mutations result in the production of a folliculin protein that is abnormally short and nonfunctional. Researchers have not determined how *FLCN* gene mutations lead to the development of primary spontaneous

pneumothorax. One theory is that the altered folliculin protein may trigger inflammation within lung tissue that could lead to the formation of small sacs of air (blebs) in the tissue. These blebs can rupture, causing air to leak into the pleural space. People who have an *FLCN* gene mutation associated with primary spontaneous pneumothorax all appear to develop blebs, but it is estimated that only 40 percent of those individuals go on to have a primary spontaneous pneumothorax.

Other cancers

Some gene mutations are acquired during a person's lifetime and are present only in certain cells. These changes, called somatic mutations, are not inherited. Somatic mutations in the *FLCN* gene are probably associated with several types of nonhereditary (sporadic) tumors. Specifically, somatic *FLCN* mutations have been identified in some cases of clear cell renal cell carcinoma (a type of kidney cancer) and in some colon cancers. These mutations may change the structure of the folliculin protein, disrupting its tumor suppressor function. Researchers do not know how *FLCN* mutations lead to these particular forms of cancer.

Other Names for This Gene

- BHD
- FLCL
- FLCN_HUMAN
- MGC17998
- MGC23445

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of FLCN (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=201163[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28%28FLCN%5BTIAB%5D%29+OR+%28folliculin%5BTIAB%5D%29%29+OR+%28%28BHD%5BTIAB%5D%29+OR+%28FLCL%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

- FOLLICULIN; FLCN (https://omim.org/entry/607273)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/201163)
- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=FLCN[gene])

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Genomic Location

The *FLCN* gene is found on chromosome 17 (https://medlineplus.gov/genetics/chromosome/17/).

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