CCM2 gene

CCM2 scaffold protein

Normal Function

The *CCM2* gene provides instructions for making a protein called malcavernin, which strengthens the interactions between cells that form blood vessels and limits leakage from the vessels. Malcavernin interacts with a number of other proteins to form a complex that is found in the junctions that connect neighboring cells. As part of this complex, malcavernin helps turn off (suppress) a signaling molecule known as RhoA-GTPase. This molecule plays a role in regulating the actin cytoskeleton, which is a network of fibers that makes up the cell's structural framework. When turned on, RhoA-GTPase stimulates the formation of actin fibers, which has been linked to weakened junctions between cells and increased leakage from blood vessels.

Malcavernin is also involved in a process called angiogenesis, which is the formation of new blood vessels.

Health Conditions Related to Genetic Changes

Cerebral cavernous malformation

Dozens of mutations in the *CCM2* gene have been identified in families with cerebral cavernous malformations, which are collections of blood vessels in the brain that are weak and prone to leakage. Most of these mutations result in an abnormally short or malformed malcavernin protein that does not function. A shortage of this protein likely impairs the function of the complex. As a result, RhoA-GTPase signaling is turned on abnormally, weakening cellular junctions and increasing the permeability of blood vessel walls. The increased leakage into the brain can cause health problems such as headaches, seizures, and bleeding in the brain (cerebral hemorrhage) in some people with cerebral cavernous malformations.

Mutations in the *CCM2* gene are involved in approximately 15 percent of all familial cerebral cavernous malformation cases.

Other Names for This Gene

- C7orf22
- CCM2 scaffolding protein

- CCM2_HUMAN
- cerebral cavernous malformation 2
- chromosome 7 open reading frame 22
- MGC4067
- MGC4607
- OSM

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of CCM2 (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=83605[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28%28CCM2%5BALL%5D%29+OR+%28cerebral+cavernous+malformation+2%5BALL%5D%29+OR+%28CCM2+gene%5BALL%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D)

Catalog of Genes and Diseases from OMIM

- CCM2 SCAFFOLD PROTEIN; CCM2 (https://omim.org/entry/607929)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/83605)
- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=CCM2[gene])

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Genomic Location

The *CCM2* gene is found on chromosome 7 (https://medlineplus.gov/genetics/chromosome/7/).

Last updated November 1, 2012