Mutations in the genes KRIT1, CCM2, and PDCD10 are known to result in the formation of cerebral cavernous malformations (CCMs).

Although these genes have been known to be associated with CCMs since the 1990s, numerous discoveries have been made that better elucidate how they and their subsequent protein products are involved in CCM pathogenesis. Since our last review of the molecular genetics of CCM pathogenesis in 2012, breakthroughs include a more thorough understanding of the protein structures of the gene products, involvement with integrin proteins, and MEKK3 signaling pathways, and the importance of CCM2-PDCD10 interactions [1)].

Programmed cell death protein 10 is a protein that in humans is encoded by the PDCD10 gene.

This gene encodes a protein, originally identified in a premyeloid cell line, with similarity to proteins that participate in apoptosis. Three alternative transcripts encoding the same protein, differing only in their 5' UTRs, have been identified for this gene.

Loss of function mutations in PDCD10 result in the onset of Cerebral Cavernous Malformations (CCM) illness.

Therefore, this gene is also called CCM3.

CCM3 encodes a protein called Programmed Cell Death 10 (PDCD10). The function of this protein has only recently begun to be understood. PDCD10 has roles in vascular development and VEGF signaling1, apoptosis and functions as part of a larger signaling complex that includes germinal center kinase III,.Specifically, PDCD10 has been shown to interact with RP6-213H19.1, STK25,STRN, STRN3, MOBKL3, CTTNBP2NL, STK24 and FAM40A.

1)
Baranoski JF, Kalani MY, Przybylowski CJ, Zabramski JM. Cerebral Cavernous Malformations: Review of the Genetic and Protein-Protein Interactions Resulting in Disease Pathogenesis. Front Surg. 2016 Nov 14;3:60. Review. PubMed PMID: 27896269.