Autosomal recessive cerebellar ataxia type 1

Description

Autosomal recessive cerebellar ataxia type 1 (ARCA1) is a condition characterized by progressive problems with movement due to a loss (atrophy) of nerve cells in the part of the brain that coordinates movement (the cerebellum). Signs and symptoms of the disorder first appear in early to mid-adulthood. People with this condition initially experience impaired speech (dysarthria), problems with coordination and balance (ataxia), or both. They may also have difficulty with movements that involve judging distance or scale (dysmetria). Other features of ARCA1 include abnormal eye movements (nystagmus) and problems following the movements of objects with the eyes. The movement problems are slowly progressive, often resulting in the need for a cane, walker, or wheelchair.

Frequency

More than 100 people have been diagnosed with ARCA1. This condition was first discovered in individuals from the Beauce and Bas-Saint-Laurent regions of Quebec, Canada, but it has since been found in populations worldwide.

Causes

Mutations in the *SYNE1* gene cause ARCA1. The *SYNE1* gene provides instructions for making a protein called Syne-1 that is found in many tissues, but it seems to be especially critical in the brain. Within the brain, the Syne-1 protein appears to play a role in the maintenance of the cerebellum, which is the part of the brain that coordinates movement. The Syne-1 protein is active (expressed) in Purkinje cells, which are located in the cerebellum and are involved in chemical signaling between nerve cells (neurons).

SYNE1 gene mutations that cause ARCA1 result in an abnormally short, dysfunctional version of the Syne-1 protein. The defective protein is thought to impair Purkinje cell function and disrupt signaling between neurons in the cerebellum. The loss of brain cells in the cerebellum causes the movement problems characteristic of ARCA1, but it is unclear how this cell loss is related to impaired Purkinje cell function.

Learn more about the gene associated with Autosomal recessive cerebellar ataxia type 1

- SYNE1

Inheritance

This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

Other Names for This Condition

- ARCA1
- Autosomal recessive spinocerebellar ataxia 8
- Recessive ataxia of Beauce

Additional Information & Resources

Genetic Testing Information

- Genetic Testing Registry: Autosomal recessive ataxia, Beauce type (https://www.ncbi.nlm.nih.gov/gtr/conditions/C1853116/)

Patient Support and Advocacy Resources

- National Organization for Rare Disorders (NORD) (https://rarediseases.org/)

Clinical Trials

- ClinicalTrials.gov (https://clinicaltrials.gov/search?cond=%22Autosomal recessive cerebellar ataxia type 1%22)

Catalog of Genes and Diseases from OMIM

- SPINOCEREBELLAR ATAXIA, AUTOSOMAL RECESSIVE 8; SCAR8 (https://omim.org/entry/610743)

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28%28SYNE1%5BTIAB%5D%29+AND+%28ataxia%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D)

References

- Beaudin M, Gamache PL, Gros-Louis F, Dupre N. SYNE1 Deficiency. 2007 Feb 23[updated 2018 Dec 6]. In: Adam MP, Feldman J, Mirzaa GM, Pagon RA, Wallace SE, Amemiya A, editors. GeneReviews(R) [Internet]. Seattle (WA): Universityof Washington, Seattle; 1993-2025. Available fromhttp://www.ncbi.nlm.nih.gov/books/NBK1379/ Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/20301553)
- Dupre N, Gros-Louis F, Chrestian N, Verreault S, Brunet D, de Verteuil D,Brais B, Bouchard JP, Rouleau GA. Clinical and genetic study of autosomalrecessive cerebellar ataxia type 1. Ann Neurol. 2007 Jul;62(1):93-8. doi:10.1002/ana.21143. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/17503513)
- Gros-Louis F, Dupre N, Dion P, Fox MA, Laurent S, Verreault S, Sanes JR, Bouchard JP, Rouleau GA. Mutations in SYNE1 lead to a newly discovered form ofautosomal recessive cerebellar ataxia. Nat Genet. 2007 Jan;39(1):80-5. doi:10.1038/ng1927. Epub 2006 Dec 10. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/17159980)
- Izumi Y, Miyamoto R, Morino H, Yoshizawa A, Nishinaka K, Udaka F, Kameyama M, Maruyama H, Kawakami H. Cerebellar ataxia with SYNE1 mutation accompanying motorneuron disease. Neurology. 2013 Feb 5;80(6):600-1. doi:10.1212/WNL.0b013e3182815529. Epub 2013 Jan 16. No abstract available. ErratumIn: Neurology. 2013 Mar 26;80(13):1267. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/23325900)
- Noreau A, Bourassa CV, Szuto A, Levert A, Dobrzeniecka S, Gauthier J, ForlaniS, Durr A, Anheim M, Stevanin G, Brice A, Bouchard JP, Dion PA, Dupre N, RouleauGA. SYNE1 mutations in autosomal recessive cerebellar ataxia. JAMA Neurol. 2013Oct;70(10):1296-31. doi: 10.1001/jamaneurol.2013.3268. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/23959263)

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