SYNGAP1-related intellectual disability

Description

SYNGAP1-related intellectual disability is a neurological disorder characterized by moderate to severe intellectual disability that is evident in early childhood. The earliest features are typically delayed development of speech and motor skills, such as sitting, standing, and walking. Many people with this condition have weak muscle tone (hypotonia), which contributes to the difficulty with motor skills. Some affected individuals lose skills they had already acquired (developmental regression). Other features of *SYNGAP1*-related intellectual disability include recurrent seizures (epilepsy), hyperactivity, and autism spectrum disorder, which is characterized by impaired communication and social interaction; almost everyone with *SYNGAP1*-related intellectual disability develops epilepsy, and about half have autism spectrum disorder.

Frequency

SYNGAP1-related intellectual disability is a relatively common form of cognitive impairment. It is estimated to account for 1 to 2 percent of intellectual disability cases.

Causes

SYNGAP1-related intellectual disability is caused by mutations in the *SYNGAP1* gene. The protein produced from this gene, called SynGAP, plays an important role in nerve cells in the brain. It is found at the junctions between nerve cells (synapses) and helps regulate changes in synapses that are critical for learning and memory. Mutations involved in this condition prevent the production of functional SynGAP protein from one copy of the gene, reducing the protein's activity in cells. Studies show that a reduction of SynGAP activity can have multiple effects in nerve cells, including pushing synapses to develop too early. The resulting abnormalities disrupt the synaptic changes in the brain that underlie learning and memory, leading to cognitive impairment and other neurological problems characteristic of *SYNGAP1*-related intellectual disability.

Learn more about the gene associated with SYNGAP1-related intellectual disability

- SYNGAP1

Inheritance

SYNGAP1-related intellectual disability is classified as an autosomal dominant condition, which means one copy of the altered gene in each cell is sufficient to cause the disorder. Almost all cases result from new mutations in the gene and occur in people with no history of the disorder in their family. In at least one case, an affected person inherited the mutation from one affected parent.

Other Names for This Condition

- Mental retardation, autosomal dominant 5
- MRD5

Additional Information & Resources

Genetic Testing Information

- Genetic Testing Registry: Intellectual disability, autosomal dominant 5 (https://www.ncbi.nlm.nih.gov/gtr/conditions/C2675473/)

Genetic and Rare Diseases Information Center

- Intellectual developmental disorder, autosomal dominant 5 (https://rarediseases.info.nih.gov/diseases/12558/index)

Patient Support and Advocacy Resources

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

Clinical Trials

- ClinicalTrials.gov (https://clinicaltrials.gov/search?cond=%22SYNGAP1-related intellectual disability%22)

Catalog of Genes and Diseases from OMIM

- INTELLECTUAL DEVELOPMENTAL DISORDER, AUTOSOMAL DOMINANT 5; MRD5 (https://omim.org/entry/612621)

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28%28SYNGAP1%29+AND+%28intellectual+disability%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5

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