



**AHDC1-related syndrome**  
- or -  
**Xia-Gibbs syndrome**





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This guide is not meant to take the place of medical advice.

Please consult with your doctor about your genetic results and health care choices. The information in this guide was up to date at the time it was written in 2019. But new information may come to light with new research. You may find it helpful to share this guide with friends and family members or doctors and teachers of the person who has AHDC1-related syndrome.



# What is AHDC1-related syndrome?



AHDC1-related syndrome happens when there are changes to the AHDC1 gene. These changes can keep the gene from working as it should. AHDC1-related syndrome is also known as Xia-Gibbs syndrome.

## Key role

The AHDC1 gene plays a key role in the growth of the brain.

## Symptoms

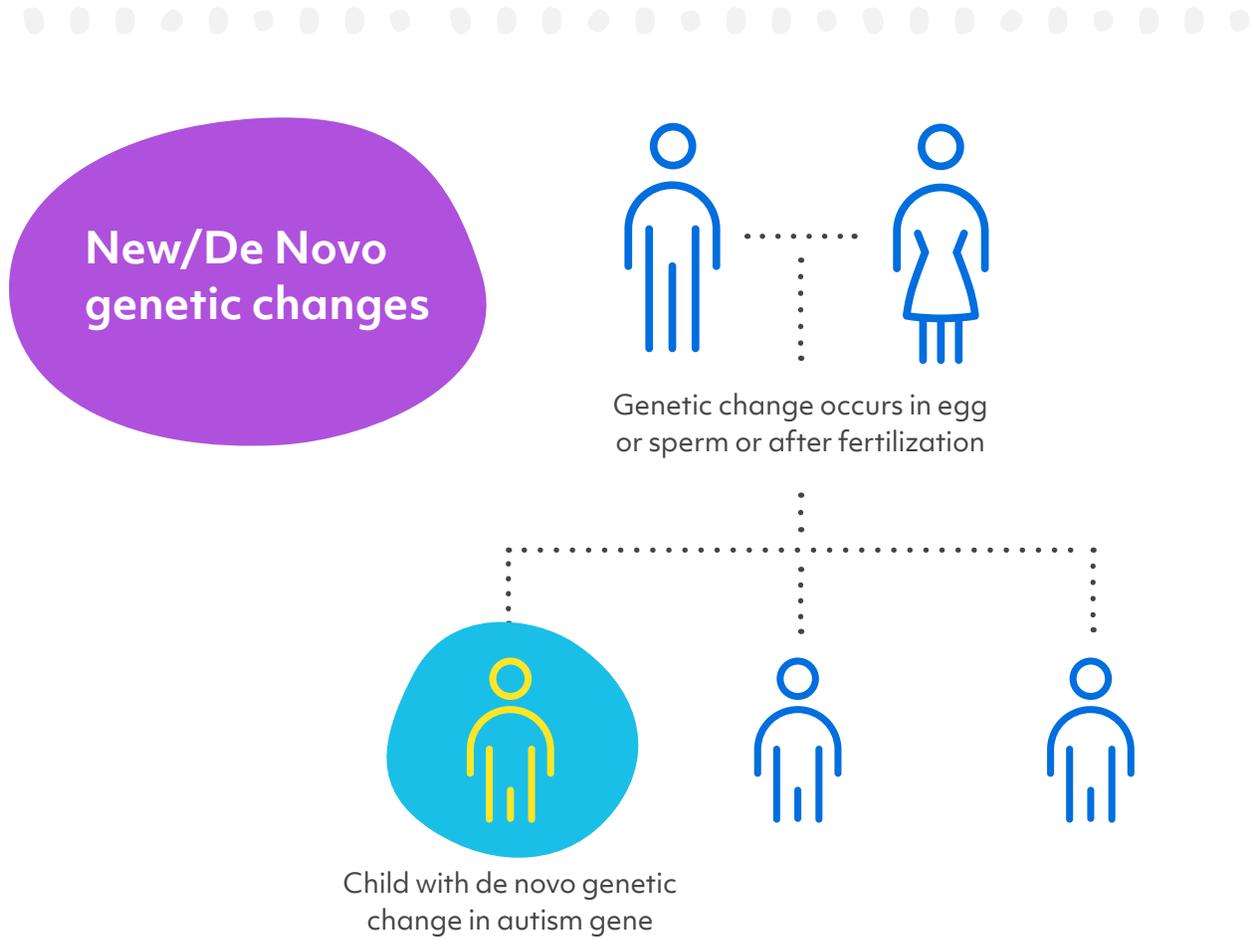
Because the AHDC1 gene is important in the development and function of brain cells, many people who have AHDC1-related syndrome have:

- Developmental delay
- Speech delay
- Sleep apnea, a disorder in which breathing stops and starts
- Seizures

## What causes AHDC1-related syndrome?

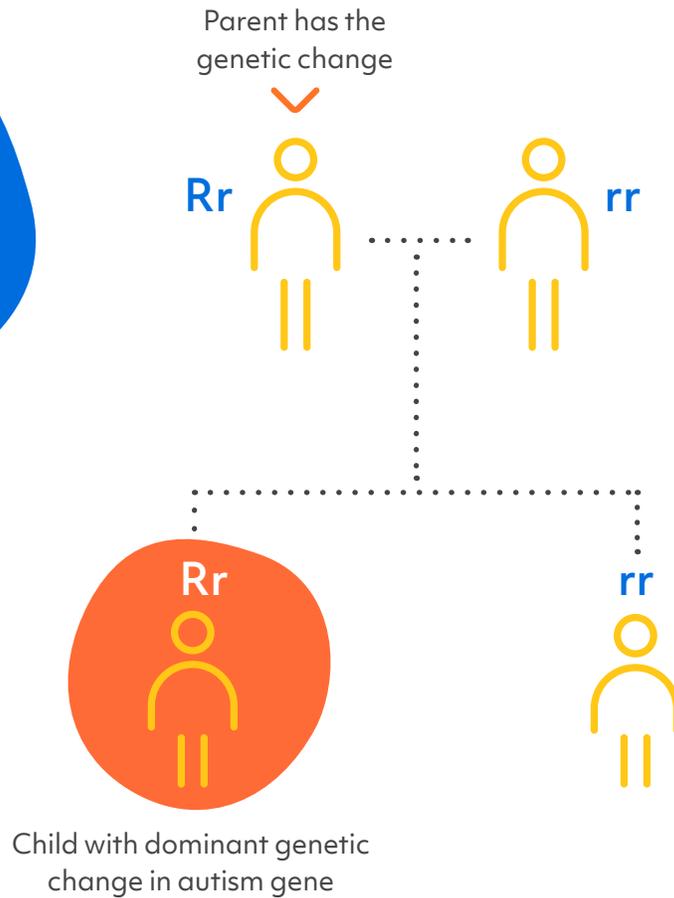
Our genes contain the instructions, or code, that tell our cells how to grow, develop, and work. Every child gets two copies of the AHDC1 gene: one copy from their mother, from the egg, and one copy from their father, from the sperm. In most cases, parents pass on exact copies of the gene to their child. But the process of copying genes is not perfect. A change in the genetic code can lead to physical issues, developmental issues, or both.

Sometimes a random change happens in the sperm or egg. This change to the genetic code is called a 'de novo', or new, change. The child can be the first in the family to have the gene change.



## Dominant inheritance

Children have a 50% chance of inheriting the genetic change



De novo changes can take place in any gene. We all have some de novo changes, most of which don't affect our health. But because AHDC1 plays a key role in development, de novo changes in this gene can have a meaningful effect.

Research shows that AHDC1-related syndrome is often the result of a de novo change in AHDC1. Many parents who have had their genes tested do not have the AHDC1 gene change found in their child who has the syndrome. In some cases, AHDC1-related syndrome happens because the gene change is passed down from a parent.

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## Why does my child or I have a change in the AHDC1 gene?

No parent causes their child's AHDC1-related syndrome. We know this because no parent has any control over the gene changes that they do or do not pass on to their children. Please keep in mind that nothing a parent does before or during the pregnancy causes this to happen. The gene change takes place on its own and cannot be predicted or stopped.





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## What are the chances that other family members or future children will have AHDC1-related syndrome?

Each family is different. A geneticist or genetic counselor can give you advice on the chance that this will happen again in your family.

The risk of having another child who has AHDC1-related syndrome depends on the genes of both birth parents.

- If neither birth parent has the same gene change found in their child, the chance of having another child who has the syndrome is on average 1 percent. This 1 percent chance is higher than the chance of the general population. The increase in risk is due to the very unlikely chance that more of the mother's egg cells or the father's sperm cells carry the same change in the gene.
- If one birth parent has the same gene change found in their child, the chance of having another child who has the syndrome is 50 percent.

For a symptom-free sibling, a brother or sister, of someone who has AHDC1-related syndrome, the risk of having a child who has the syndrome depends on the symptom-free sibling's genes and their parents' genes.

- If neither parent has the same gene change found in their child who has the syndrome, the symptom-free sibling has a nearly 0 percent chance of having a child who has AHDC1-related syndrome.
- If one birth parent has the same gene change found in their child who has the syndrome, the symptom-free sibling has a small chance of also having the same gene change. If the symptom-free sibling has the same gene change as their sibling who has the syndrome, the symptom-free sibling's chance of having a child who has AHDC1-related syndrome is 50 percent.

For a person who has AHDC1-related syndrome, the risk of having a child who has the syndrome is about 50 percent.

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## How many people have AHDC1-related syndrome?

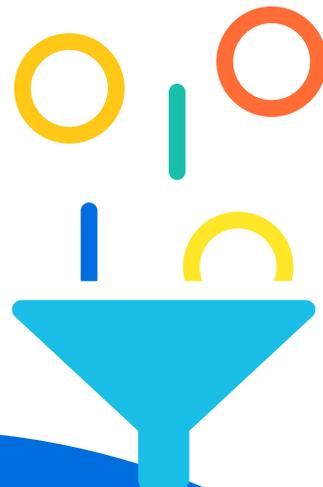
As of 2019, doctors had found about 60 people in the world with changes in the AHDC1 gene. The first case of AHDC1-related syndrome was described in 2014. Scientists expect to find more people who have the syndrome as access to genetic testing improves.

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## Do people who have AHDC1-related syndrome look different?

People who have AHDC1-related syndrome can look different. Appearance can vary and can include some but not all of these features:

- Broad forehead
- Widely spaced eyes
- Flat bridge of nose
- Thin upper lip



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## How is AHDC1-related syndrome treated?

Scientists and doctors have only just begun to study AHDC1-related syndrome. At this point, there are no medicines designed to treat the syndrome. A genetic diagnosis can help people decide on the best way to track the condition and manage therapies. Doctors can refer people to specialists for:

- Physical exams and brain studies
- Genetics consults
- Development and behavior studies
- Other issues, as needed

A developmental pediatrician, neurologist, or psychologist can follow progress over time and can help:

- Suggest the right therapies. This can include physical, occupational, speech, or behavioral therapy.
- Guide individualized education plans (IEPs).

Specialists advise that therapies for AHDC1-related syndrome should begin as early as possible, ideally before a child begins school.

If seizures happen, consult a neurologist. There are many types of seizures, and not all types are easy to spot. To learn more, you can refer to resources such as the Epilepsy Foundation's website: [epilepsy.com/learn/types-seizures](https://www.epilepsy.com/learn/types-seizures).

AHDC1-related syndrome is very rare. Doctors and scientists have just recently begun to study it. As of 2019, studies described around 60 people who have AHDC1-related syndrome.

This section includes a summary of information from major published articles. It highlights how many people have different symptoms. To learn more about the articles, see the [Sources and references](#) section of this guide.

## Behavior and development concerns linked to AHDC1-related syndrome

### Speech

People who have the syndrome often have **limited communication skills**.



Average age for first word:  
**2 years to 3 years old**

Average age for using  
two words together:  
**3 years to 4 years old**

# Behavior and development concerns linked to AHDC1-related syndrome

## Learning

People often have some level of **intellectual disability**.



## Behavior



About one-half of those who have the syndrome have **sleep apnea**, a condition in which people stop breathing during sleep for short periods of time. Some use a breathing aid during sleep.

One-quarter have **autism or symptoms of autism**.



# Medical and physical concerns linked to AHDC1-related syndrome

## Growth

Many children who have the syndrome **grow slowly** and are shorter than their peers.

## Sitting and walking

Children often start **walking late**. Most start walking by themselves between 2 years and 3 years old.

## Muscle tone

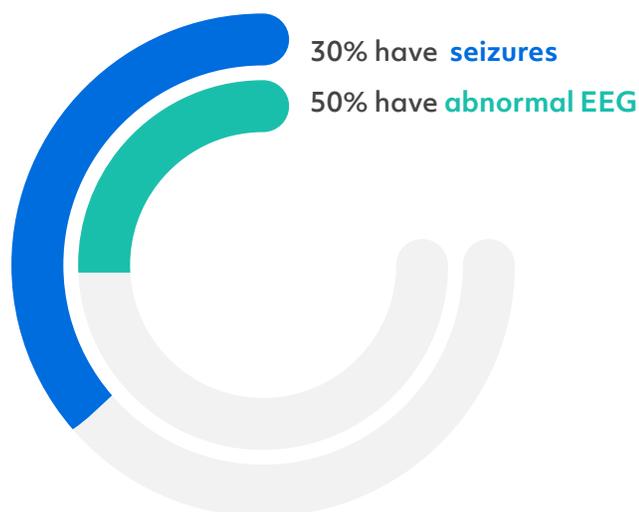
Some people have low muscle tone, also called **hypotonia**, and may be described as “floppy”. Their joints may be very flexible. Low muscle tone can delay the age at which children start rolling over, sitting, crawling, and walking.

## Feeding and digestion issues

Low muscle tone can sometimes lead to **difficulty eating**.

## Brain

About one-third of people who have the syndrome have **seizures**, which start at about 4 years of age. About half have an abnormal electrocorticogram, or EEG, a medical test that measures electrical activity in the brain.



# Medical and physical concerns linked to AHDC1-related syndrome

## Eyes and eyesight

Some people have crossed eyes, also called **strabismus**.



## Joints and spine

Some people have a curved spine, also called **scoliosis**. In 4 out of 20 people who have the syndrome, scoliosis starts at 10 years to 15 years of age.





**Where can I  
find support  
and resources?**

**Xia-Gibbs Society**  
[www.xia-gibbs.org](http://www.xia-gibbs.org)



**Simons Searchlight** is another research program sponsored and run by the Simons Foundation Autism Research Initiative, also known as SFARI. As part of the next step in your research journey, Simons Searchlight offers you the opportunity to partner with scientists and other families who have the same gene change. Simons Searchlight is a registry for more than 150 genetic changes that are associated with neurodevelopmental conditions, including autism spectrum disorder. Simons Searchlight makes it easier for researchers to access the information they need to advance research on a condition.

To register for Simons Searchlight, go to the Simons Searchlight website at [www.simonssearchlight.org](http://www.simonssearchlight.org) and click “**Join Us Today**”.

- **Learn more about Simons Searchlight**  
[www.simonssearchlight.org/frequently-asked-questions](http://www.simonssearchlight.org/frequently-asked-questions)
- **Simons Searchlight webpage with more information on AHDC1**  
[www.simonssearchlight.org/research/what-we-study/ahdc1](http://www.simonssearchlight.org/research/what-we-study/ahdc1)
- **Simons Searchlight Facebook group**  
[www.facebook.com/groups/AHDC1](http://www.facebook.com/groups/AHDC1)

## Sources and References

The content in this guide comes from published studies about AHDC1-related syndrome. Below you can find details about each study, as well as links to summaries or, in some cases, the full article.

- Yang H. *et al.* *Cold Spring Harbor Molecular Case Studies*, **1**, a000562, (2015). De novo truncating variants in the AHDC1 gene encoding the AT-hook DNA-binding motif-containing protein 1 are associated with intellectual disability and developmental delay  
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Last updated March 2020

