STXBP1-related syndrome
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 STXBP1-related syndrome.
What is STXBP1-related syndrome?

STXBP1-related syndrome happens when there are changes to the STXBP1 gene. These changes can keep the gene from working as it should. The syndrome is also known as STXBP1 encephalopathy or STXBP1-E.

Key role
The STXBP1 gene plays a key role in how brain cells communicate.

Symptoms
Because the STXBP1 gene is important in brain cell function, many people who have STXBP1-related syndrome have:

- Seizures
- Movement challenges
- Autism spectrum disorder
Our genes contain the instructions, or code, that tell our cells how to grow, develop, and work. Every child gets two copies of the STXBP1 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.

What causes STXBP1-related syndrome?

New/De Novo genetic changes

Genetic change occurs in egg or sperm or after fertilization

Child with de novo genetic change in autism gene
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 STXBP1 plays a key role in development, de novo changes in this gene can have a meaningful effect.

Research shows that STXBP1-related syndrome is often the result of a de novo change in STXBP1. Many parents who have had their genes tested do not have the STXBP1 gene change found in their child who has the syndrome. In some cases, STXBP1-related syndrome happens because the gene change was passed down from a parent. This is called dominant inheritance.

**Dominant inheritance**

Children have a 50% chance of inheriting the genetic change.

- Parent has the genetic change
- Child with dominant genetic change in autism gene
Why does my child have a change in the STXBP1 gene?

No parent causes their child's STXBP1-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.
What are the chances that other family members or future children will have STXBP1-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 STXBP1-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 STXBP1-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 STXBP1-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 STXBP1-related syndrome is 50 percent.

For a person who has STXBP1-related syndrome, the risk of having a child who has the syndrome is about 50 percent.
How many people have STXBP1-related syndrome?

As of 2019, about 200 people in the world with changes in the STXBP1 gene had been described in medical research. The first case of STXBP1-related syndrome was described in 2008. Scientists expect to find more people who have the syndrome as access to genetic testing improves.

Do people who have STXBP1-related syndrome look different?

People who have STXBP1-related syndrome generally don’t look different.
How is STXBP1-related syndrome treated?

Scientists and doctors have only just begun to study STXBP1-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 STXBP1-related syndrome should begin as early as possible, ideally before a child begins school.

If seizures happen, consult a neurologist. There are many different 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: www.epilepsy.com/learn/types-seizures.
STXBP1-related syndrome is very rare. Doctors and scientists have just recently begun to study it. As of 2019, studies described around 200 people who have STXBP1-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 STXBP1-related syndrome**

### Learning
Almost everyone who has STXBP1-related syndrome has some level of intellectual disability. About 90 percent have severe intellectual disability.

![90% have severe intellectual disability](image)

### Behavior
About 20 percent of people who have the syndrome have repetitive behaviors. About 17 percent have autism.

20% have **repetitive behaviors**

17% have **autism**
Almost everyone — 95 percent — who has the syndrome has seizures at some point in their lives. More than one-half have early-onset seizures.

### Brain
Almost everyone — 95 percent — who has the syndrome has seizures at some point in their lives. More than one-half have early-onset seizures.

### Sitting and walking
More than one-half of people who have the syndrome are unable to walk on their own.

### Muscle tone
Most people who have the syndrome have low muscle tone.

### Other motor concerns
Issues with motor coordination and motor control are common.
Where can I find support and resources?

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 200 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 and click “Join Us Today”.

- Learn more about Simons Searchlight www.simonssearchlight.org/frequently-asked-questions
- Simons Searchlight webpage with more information on STXBP1 www.simonssearchlight.org/research/what-we-study/stxbp1
- Simons Searchlight STXBP1 Facebook community www.facebook.com/groups/STXBP1
Sources and References

The content in this guide comes from published studies about STXBP1-related syndrome. Below you can find details about each study, as well as links to summaries or, in some cases, the full article.

  www.ncbi.nlm.nih.gov/books/NBK396561

  www.ncbi.nlm.nih.gov/pubmed/26865513