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# What Causes Alzheimer's Disease?

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[Alzheimer's disease](#) is a brain disorder that slowly destroys memory and thinking skills, and eventually, the ability to carry out the simplest tasks. The disease is the most common form of dementia among older adults. Symptoms include the loss of cognitive functioning — thinking, remembering, and reasoning — and the loss of behavioral abilities. Eventually, this loss of functioning increases to where it interferes with a person's daily life and activities.

In recent years, scientists have made tremendous progress in understanding Alzheimer's. Still, they don't yet fully understand what causes the disease in most people. The causes probably include a combination of age-related changes in the brain, along with genetic, health, and lifestyle factors.



## Aging and Alzheimer's risk

Age is the biggest known risk factor for Alzheimer's. Most people with Alzheimer's develop the disease when they are 65 or older, with less than 10% of cases occurring before then. As a person ages past 65, their risk of Alzheimer's increases. About one in 13 people 65 to 84 and one in three people 85 and older live with Alzheimer's.

One of the great mysteries of Alzheimer's is why it largely affects older adults. Research on normal brain aging is exploring this question. For example, scientists are learning how age-related changes in the brain may harm neurons and affect other types of brain cells to contribute to Alzheimer's damage.

These age-related changes include:

- Shrinking of certain brain regions
- Inflammation
- Blood vessel damage
- The production of unstable molecules called free radicals
- Decreased energy production within cells

Read more about [what happens to the brain in Alzheimer's](#).

## Clinical trials on Alzheimer's disease

Researchers need volunteers to take part in the hundreds of active clinical trials and studies that are testing ways to better understand, diagnose, treat, and prevent Alzheimer's.

Researchers need people of different ages, sexes, races, and ethnicities to ensure that their studies apply to wide groups of people. By joining a study, you can learn more about Alzheimer's and help researchers learn more about causes and risk factors for the disease.

Find clinical trials near you

## Genetics of Alzheimer's disease

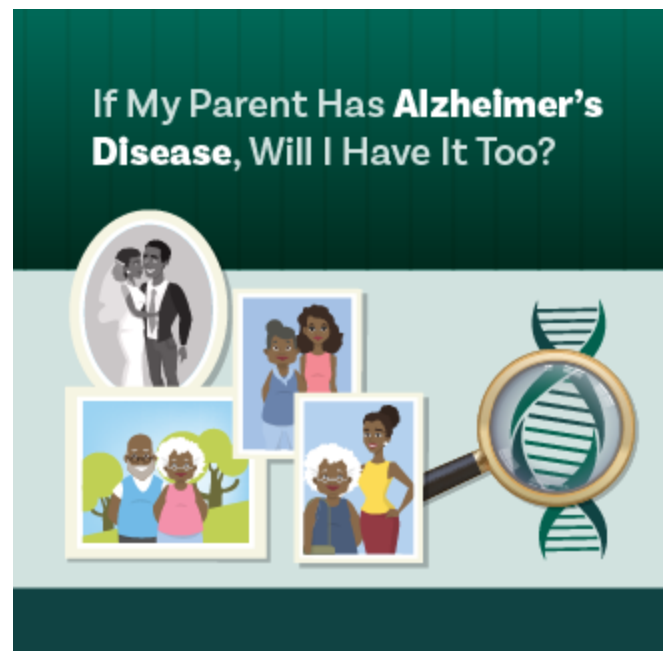
Genes are passed down from your biological parents. They carry information that defines traits such as eye color and height. Variations in genes — even small changes — can affect the likelihood of a person developing a disease such as Alzheimer's.

In most cases, Alzheimer's does not have a single genetic cause. Instead, it can be influenced by multiple genes in combination with lifestyle and environmental factors. A person may carry more than one genetic variant or group of variants that can either increase or reduce the risk of Alzheimer's.

Importantly, people who develop Alzheimer's do not always have a history of the disease in their families. Still, those who have a parent or sibling diagnosed with the disease have a higher risk of developing Alzheimer's than those who don't have a close relative with the disease.

### Genetic variants that affect Alzheimer's disease risk

One well-known gene that influences Alzheimer's risk is the *apolipoprotein E (APOE)* gene. The *APOE* gene is involved in making a protein that helps carry cholesterol



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and other types of fat in the bloodstream. Problems in this process may contribute to the development of Alzheimer's.

*APOE* comes in several forms, called alleles (e.g.,  $\epsilon 2$ ,  $\epsilon 3$ ). Each person inherits two *APOE* alleles, one from each biological parent. The *APOE*  $\epsilon 4$  allele increases risk for Alzheimer's and is associated with an earlier age of disease onset in certain populations. While inheriting *APOE*  $\epsilon 4$  increases a person's risk of Alzheimer's, some people with an *APOE*  $\epsilon 4$  allele never develop the disease.

## Genetic variants that cause Alzheimer's disease

Of the genetic variants associated with Alzheimer's so far, rare variants in three genes are known to cause the disease:

- Amyloid precursor protein (*APP*) on chromosome 21
- Presenilin 1 (*PSEN1*) on chromosome 14
- Presenilin 2 (*PSEN2*) on chromosome 1

A child whose biological parent carries a genetic variant for one of these three genes has a 50/50 chance of inheriting that altered version of the gene. If the variant is inherited, the child has a very strong probability of developing Alzheimer's before age 65 and sometimes much earlier.

You may be interested in learning more about [the genetics of Alzheimer's](#).

## Alzheimer's and Down syndrome

People with Down syndrome have a higher risk of developing Alzheimer's disease earlier in life. Estimates suggest that 50% or more of people living with Down syndrome will develop Alzheimer's, with symptoms appearing in their 50s or 60s.

Read more about [Alzheimer's in people with Down syndrome](#).

## Health and lifestyle factors that may contribute to Alzheimer's risk

Research suggests that a [host of factors](#) beyond age and genetics may play a role in the development and course of Alzheimer's. For example, there is significant interest in the relationship between cognitive decline and vascular conditions such as [heart disease](#), [stroke](#), and [high blood pressure](#). Scientists are also looking at the role of metabolic diseases, such as [diabetes](#) and obesity.

In addition, other medical conditions associated with a higher risk of Alzheimer's include:

- [Hearing loss](#)

- [Depression](#)
- [Mild cognitive impairment](#)
- Concussion or other [traumatic brain injury](#)

In time, research may help scientists understand whether reducing risk factors for these health conditions could also reduce the risk for Alzheimer's.

There are some risk factors, like age, that you cannot change. However, there may be ways to promote better brain health and reduce your risk of Alzheimer's by addressing certain lifestyle factors, including:

- Unmanaged chronic health issues, such as high blood pressure or hearing loss
- Physical inactivity
- Unhealthy diet
- Alcohol misuse
- Smoking
- Not getting enough sleep or not sleeping well
- Social isolation
- Lack of mental stimulation

Researchers cannot yet say for certain whether making positive changes in these areas can prevent dementia, but doing so is beneficial to living a healthier lifestyle overall. Getting recommended health screenings and regularly checking in with a health care provider can help you learn about and manage medical conditions.

## You may also be interested in

- Learning the [signs of Alzheimer's](#)
- Reading this [fact sheet on Alzheimer's](#)
- Considering your [risk for Alzheimer's](#)

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NIA Alzheimer's and related Dementias Education and Referral (ADEAR) Center

800-438-4380

[adear@nia.nih.gov](mailto:adear@nia.nih.gov)

[www.nia.nih.gov/alzheimers](http://www.nia.nih.gov/alzheimers)

The NIA ADEAR Center offers information and free print publications about Alzheimer's and related dementias for families, caregivers, and health professionals. ADEAR Center staff answer telephone, email, and written requests and make referrals to local and national resources.

### **Alzheimers.gov**

[www.alzheimers.gov](http://www.alzheimers.gov)

Explore the Alzheimers.gov website for information and resources on Alzheimer's and related dementias from across the federal government.

### **MedlinePlus**

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### **National Human Genome Research Institute**

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Content reviewed: July 2, 2024

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