

What is Alzheimer's disease?

Alzheimer's disease (AD) is the most common cause of dementia. The main features are memory loss, disorientation, and mood or behavior changes that worsen over time.

What are genes?

Genes are the instruction manuals of our bodies that tell our cells how to grow, develop, and stay healthy. We inherit one copy of every gene from each parent. This means there are two copies of every gene. Sometimes, we are born with changes in our genes. Genetic changes can cause higher risks of developing health conditions.

Is Alzheimer's disease genetic?

There are two types of AD: early-onset, diagnosed before age 65, and late-onset, diagnosed at age 65 or later.

Early onset: Less than ten percent of individuals with AD have early-onset disease. A fraction of early-onset AD is caused by pathogenic variants or mutations in one of three genes: *APP*, *PSEN1*, or *PSEN2*. Inheriting one of these pathogenic variants or mutations gives an individual a very strong probability of developing AD.

Late onset: Most individuals with AD have late-onset disease. There has not been a specific gene identified to cause late-onset AD. However, genetic variants in the *APOE* gene have been linked to one's risk of developing AD:

- *APOE2* – relatively rare; provides some protection against AD
- *APOE3* – most common; plays a neutral role in neither increasing nor decreasing risk of AD
- *APOE4* – 25% of people carry at least one copy of this variant; increases risk for AD but does not mean one will certainly develop AD

What are my options for genetic testing for Alzheimer's disease?

Genetic testing for late onset AD provides limited information about a person's chances of developing or preventing the disease. We do not currently offer genetic testing for AD at TriHealth. *APOE* variant testing is not recommended due to limited usefulness in medical care. Genetic testing for early onset AD should be considered only after pre-test counseling in a specialized multidisciplinary clinic that includes a neurologic and psychiatric evaluation. If you are interested in AD risk discussion, evaluation, or research that may include genetic testing, please contact the University of Cincinnati College of Medicine's Cognitive Disorders Division at (513) 475-8730.

Without genetic testing, what is my risk of developing Alzheimer's disease?

In the general population, the lifetime risk of developing AD is 10-12%. Age is the strongest risk factor for developing the disease. Regarding family history, a person with a first degree relative with AD (parent, sibling) has about a two to three times higher risk of developing the illness compared to someone without a family history.

Additional Resources:

<https://www.alz.org/alzheimers-dementia/what-is-alzheimers/causes-and-risk-factors/genetics>

<https://www.nia.nih.gov/health/alzheimers-disease-genetics-fact-sheet>

References:

Goldman JS, Hahn SE, Catania JW, et al. Genetic counseling and testing for Alzheimer disease: joint practice guidelines of the American College of Medical Genetics and the National Society of Genetic Counselors [published correction appears in *Genet Med*. 2011 Aug;13(8):749]. *Genet Med*. 2011;13(6):597-605. doi:10.1097/GIM.0b013e31821d69b8