

Alzheimer's disease

A topic in the Alzheimer's Association® series on understanding dementia.

About dementia

Dementia is a general term for a decline in mental ability severe enough to interfere with daily life. Dementia is not a single disease; it's the umbrella term for an individual's changes in memory, thinking or reasoning. There are many possible causes of dementia, including Alzheimer's disease. Disorders grouped under the general term "dementia" are caused by abnormal brain changes. These changes trigger a decline in thinking skills, also known as cognitive abilities, severe enough to impair daily life and independent function. They also affect behavior, feelings and relationships.

Brain changes that cause dementia may be temporary, but they are most often permanent and worsen, leading to increasing disability and a shortened life span. Survival can vary widely, depending on such factors as the cause of the dementia, age at diagnosis and other health conditions of the individual.

Alzheimer's disease

Alzheimer's disease is not a normal part of aging — it is a progressive brain disease that causes problems with memory, thinking and behavior. Alzheimer's is the most common cause of dementia, contributing to 60% to 80% of dementia cases. Although there is currently no cure for Alzheimer's, researchers are paving the way for future treatments by uncovering new insights into the biology of the disease.

Risk factors

Researchers believe there is not a single cause of Alzheimer's disease. It likely develops from multiple factors, such as genetics, lifestyle and environment. Scientists have identified factors that increase the risk of Alzheimer's. While some risk factors like age, family history and genetics can't be changed, emerging evidence suggests there may be other factors people can influence.

Age

The greatest risk for Alzheimer's disease is age. After age 65, a person's risk of developing the disease increases dramatically. About a third of people age 85 or older have Alzheimer's.

Family history

Researchers have learned that people who have a parent, brother or sister with Alzheimer's are more likely to develop it than those who do not. The risk increases if more than one family member has the disease.

Genetics

Two types of genes influence whether a person develops a disease: risk genes and deterministic genes. Risk genes increase the chance of developing a disease but do not guarantee it will happen. Deterministic genes cause a disease. This means anyone who inherits a deterministic gene will develop a disorder.

Rare deterministic genes cause Alzheimer's in a few hundred extended families worldwide. Scientists estimate these genes cause less than 1% of cases. Individuals with these genes usually develop symptoms in their 40s or 50s.

Hispanic people, Black Americans and women

Research shows Black Americans are about twice as likely as White Americans to have Alzheimer's or another dementia, and Hispanic Americans are one-and-a-half times as likely. Though no one knows the exact reason for these differences, researchers believe they are related to disparities produced by the historic and continued marginalization of Black and Hispanic people in the United States — disparities between older Black and Hispanic populations and older White populations in life experiences, socioeconomic indicators and, ultimately, health conditions.

Additionally, women are more likely to develop Alzheimer's than men. This difference may be explained, in part, by the fact that women live longer. However, researchers are exploring how genetic differences may impact Alzheimer's risk differently in men and women.

Lowering the risk of cognitive decline

Age, family history and genetics are all risk factors that can't be changed. However, research is offering clues about other risk factors that people may be able to influence. Studies show a strong connection between serious head injury and future risk of Alzheimer's. For this reason, it is important to protect against head injury by

wearing a seat belt in the car, wearing a helmet when playing sports and making sure the home is safe to avoid falls.

Research also shows there are lifestyle habits that people can adopt to help keep their brain healthy and lower their risk of cognitive decline. These include eating a healthy diet, staying socially active and exercising the body and mind. Not using tobacco and avoiding excess alcohol is also good for brain health.

Science tells us there is a strong connection between brain health and heart health. The risk of developing dementia appears to be increased by many conditions that damage the heart and blood vessels. These include heart disease, diabetes, stroke, high blood pressure and high cholesterol.

Symptoms and signs

The symptoms of Alzheimer's disease are more than simple lapses in memory or age-related changes. People living with Alzheimer's disease experience memory loss as well as difficulties communicating, learning, thinking and reasoning. These are problems severe enough to interfere with an individual's work, social activities and family life.

As the disease progresses, individuals may also experience changes in personality and behavior, such as anxiety, suspicion or agitation, as well as delusions or hallucinations.

In collaboration with experts in the field, the Alzheimer's Association® created a list of warning signs to help people identify symptoms that may be related to Alzheimer's or another form of dementia (**alz.org/10signs**). It is possible for individuals to experience one or more of these signs in varying degrees. It is not necessary to experience every sign in order to raise concern.

If you're concerned that you or someone you know is displaying any of these signs, take action. It can be helpful to confide in a friend or family member. For tips on how to have a conversation, visit **alz.org/memoryconcerns**.

Diagnosis

Multiple conditions can cause cognitive changes, so it's essential to obtain a full medical evaluation to determine whether symptoms are related to Alzheimer's or

something else. If the cause is not Alzheimer's or another dementia, it could be a treatable condition. If it is dementia, there are many benefits to receiving an early and accurate diagnosis, including an opportunity to plan for the future, access support services and explore medication that may address some symptoms for a time.

There is no single diagnostic test that can determine if a person has Alzheimer's disease. However, diagnostic tools and criteria make it possible for physicians to make a diagnosis of Alzheimer's with about 90% accuracy. The diagnostic process may involve a thorough medical history, mental status and mood testing, a physical and neurological exam, and tests (such as blood tests and brain scans) to rule out other causes of dementia-like symptoms. This process may take more than one day or visit. To learn more about the diagnostic process, visit alz.org/evaluatememory.

Treatments

Progress in Alzheimer's and dementia research is creating promising new treatments for people living with the disease.

The U.S. Food and Drug Administration (FDA) has approved medications that fall into two categories: drugs that change disease progression in people living with Alzheimer's, and drugs that may temporarily mitigate some of the symptoms of the disease.

When considering any treatment, it is important to have a conversation with a health care professional to determine whether it is appropriate. A physician who is experienced in using these types of medications should monitor people who are taking them and ensure that the recommended guidelines are strictly observed.

Drugs that change disease progression

Drugs in this category slow disease progression by changing the underlying biology of the disease process. They aim to slow the decline of memory and thinking, as well as function, in people living with Alzheimer's disease.

The treatment landscape is rapidly changing. For the most up-to-date information on FDA-approved treatments for Alzheimer's disease, visit alz.org/medications.

Amyloid-targeting approaches

Anti-amyloid treatments work by attaching to and removing beta-amyloid, a protein that accumulates into plaques, from the brain. (These plaques disrupt communication between nerve cells and may activate immune system cells that trigger inflammation and devour disabled nerve cells.) Each treatment in progress works differently and targets beta-amyloid at a different stage of plaque formation.

These treatments change the course of the disease in a meaningful way for people in the early stages, giving them more time to participate in daily life and live independently. Clinical trial participants who received anti-amyloid treatments experienced reduction in cognitive decline observed through measures of cognition and function.

Examples of cognition measures include:

- Memory
- Orientation

Examples of functional measures include:

- Handling personal finances.
- Performing household chores such as cleaning.

Anti-amyloid treatments do have side effects. These treatments can cause serious allergic reactions. Side effects can also include amyloid-related imaging abnormalities (ARIA), infusion-related reactions, headaches and falls.

ARIA is a common side effect that does not usually cause symptoms but can be serious. It is typically a temporary swelling in areas of the brain that usually resolves over time. Some people may also have small spots of bleeding in or on the surface of the brain with the swelling, although most people with swelling do not have symptoms. Some may have symptoms of ARIA such as headache, dizziness, nausea, confusion and vision changes.

Some people have a genetic risk factor (APOE-e4 gene) that may cause an increased risk for ARIA. The FDA encourages that testing for APOE-e4 status be performed prior to initiation of treatment to inform the risk of developing ARIA. Prior to testing, doctors should discuss with patients the risk of ARIA and the implications of genetic testing results.

These are not all the possible side effects, and individuals should talk with their doctors to develop a treatment plan that is right for them, including weighing the benefits and risks of all approved therapies.

Aducanumab (Aduhelm®)

Aducanumab (Aduhelm®), a monthly anti-amyloid antibody intravenous (IV) infusion therapy, was the first therapy to demonstrate that removing beta-amyloid from the brain reduces cognitive and functional decline in people living with early Alzheimer's.

As of January 2024, aducanumab is being discontinued by its manufacturer, Biogen.

Lecanemab (Leqembi®)

Lecanemab (Leqembi®) is an anti-amyloid antibody intravenous (IV) infusion therapy that is delivered every two weeks. It has received traditional approval from the FDA to treat early Alzheimer's disease, including people living with mild cognitive impairment (MCI) or mild dementia due to Alzheimer's disease who have confirmation of elevated beta-amyloid levels in the brain. There is no safety or effectiveness data on initiating treatment at earlier or later stages of the disease than were studied.

Lecanemab was the second therapy to demonstrate that removing beta-amyloid from the brain reduces cognitive and functional decline in people living with early Alzheimer's.

Name (Generic/Brand)	Approved for	Side effects
Lecanemab Leqembi®	Mild cognitive impairment and mild dementia due to Alzheimer's disease	Infusion-related reactions, headache, ARIA

Drugs that treat symptoms

Cognitive symptoms (memory and thinking)

These medications are prescribed to treat symptoms related to memory and thinking. While these drugs cannot stop the damage Alzheimer's causes to brain cells, they may help lessen or stabilize symptoms for a limited time by affecting certain chemicals involved in carrying messages between the brain's nerve cells.

The drugs currently approved to treat cognitive symptoms are cholinesterase inhibitors and glutamate regulators.

Cholinesterase inhibitors

Cholinesterase (KOH-luh-NES-ter-ays) inhibitors are prescribed to treat symptoms related to memory, thinking, language, judgment and other thought processes. These medications prevent the breakdown of acetylcholine (a-SEA-til-KOHlean), a chemical messenger important for memory and learning. These drugs support communication between nerve cells.

The cholinesterase inhibitors most commonly prescribed are:

Donepezil (Aricept®): approved to treat all stages of Alzheimer's disease.

Rivastigmine (Exelon®): approved for mild-to-moderate Alzheimer's as well as mild-to-moderate dementia associated with Parkinson's disease.

Galantamine (Razadyne®): approved for mild-to-moderate stages of Alzheimer's disease.

Though generally well-tolerated, if side effects occur, they commonly include nausea, vomiting, loss of appetite and increased frequency of bowel movements.

Glutamate regulators

Glutamate regulators are prescribed to improve memory, attention, reason, language and the ability to perform simple tasks. This type of drug works by regulating the activity of glutamate, a different chemical messenger that helps the brain process information. This drug is known as:

Memantine (Namenda®): approved for moderate-to-severe Alzheimer's disease. Can cause side effects, including headache, constipation, confusion and dizziness.

Cholinesterase inhibitor + glutamate regulator

This type of drug is a combination of a cholinesterase inhibitor and a glutamate regulator.

Donepezil and memantine (Namzaric®): approved for moderate-to-severe Alzheimer’s disease. Possible side effects include nausea, vomiting, loss of appetite, increased frequency of bowel movements, headache, constipation, confusion and dizziness.

Name (Generic/Brand)	Approved for	Side effects
Donepezil Aricept®	Mild to severe dementia due to Alzheimer’s	Nausea, vomiting, loss of appetite, muscle cramps and increased frequency of bowel movements.
Galantamine Razadyne®	Mild to moderate dementia due to Alzheimer’s	Nausea, vomiting, loss of appetite and increased frequency of bowel movements.
Rivastigmine Exelon®	Mild to moderate dementia due to Alzheimer’s or Parkinson’s	Nausea, vomiting, loss of appetite and increased frequency of bowel movements.
Memantine Namenda®	Moderate to severe dementia due to Alzheimer’s	Headache, constipation, confusion and dizziness.
Memantine + Donepezil Namzaric®	Moderate to severe dementia due to Alzheimer’s	Nausea, vomiting, loss of appetite, increased frequency of bowel movements, headache, constipation, confusion and dizziness.

Noncognitive symptoms (behavioral and psychological symptoms)

Alzheimer’s affects more than just memory and thinking. A person’s quality of life may be impacted by a variety of behavioral and psychological symptoms that accompany dementia, such as sleep disturbances, agitation, hallucinations and delusions. Some medications focus on treating these noncognitive symptoms for a time, though it is important to try non-drug strategies to manage behaviors before adding medications.

The FDA has approved one drug to address symptoms of insomnia that has been tested in people living with dementia and one that treats agitation.

Orexin receptor antagonist

Prescribed to treat insomnia, this drug inhibits the activity of orexin, a type of neurotransmitter involved in the sleep-wake cycle:

Suvorexant (Belsomra®): approved for treatment of insomnia and has been shown in clinical trials to be effective for people living with mild to moderate Alzheimer's disease. Possible side effects include, but are not limited to: risk of impaired alertness and motor coordination (including impaired driving), worsening of depression or suicidal thinking, complex sleep behaviors (such as sleep-walking and sleep-driving), sleep paralysis and compromised respiratory function.

Atypical antipsychotics

Atypical antipsychotics are a group of antipsychotic drugs that target the serotonin and dopamine chemical pathways in the brain. These drugs are largely used to treat schizophrenia and bipolar disorder and as add-on therapies for major depressive disorder. The FDA requires that all atypical antipsychotics carry a safety warning that the medication has been associated with an increased risk of death in older patients with dementia-related psychosis.

Many atypical antipsychotic medications are used "off-label" to treat dementia-related behaviors, and there is currently only one FDA-approved atypical antipsychotic to treat agitation associated with dementia due to Alzheimer's. It is important to try non-drug strategies to manage non-cognitive symptoms — like agitation — before adding medications.

Brexpiprazole (Rexulti®): approved for the treatment of agitation associated with dementia due to Alzheimer's disease. Possible side effects include, but are not limited to: weight gain, sleepiness, dizziness, common cold symptoms, and restlessness or feeling like you need to move. Warning for serious side effects: increased risk of death in older adults with dementia-related psychosis. Rexulti is not approved for the treatment of people with dementia-related psychosis without agitation that may happen with dementia due to Alzheimer's disease.

Name (Generic/Brand)	Indicated for	Common side effects
Brexipiprazole Rexulti®	Agitation associated with dementia due to Alzheimer's disease	<p>Weight gain, sleepiness, dizziness, common cold symptoms, and restlessness or feeling like you need to move.</p> <p>Warning for serious side effects: increased risk of death in older adults with dementia-related psychosis. Rexulti is not approved for the treatment of people with dementia-related psychosis without agitation that may happen with dementia due to Alzheimer's disease.</p>
Suvorexant Belsomra®	Insomnia in people living with mild to moderate Alzheimer's disease	Impaired alertness and motor coordination, worsening of depression or suicidal thinking, complex sleep behaviors, sleep paralysis, compromised respiratory function.

Progression

Alzheimer's disease progresses in stages with a range of symptoms that increase in severity over time. Because the disease affects people in different ways, the rate of progression will vary. On average, a person with Alzheimer's may live four to eight years after diagnosis, but some people live as long as 20 years. Stages of Alzheimer's may overlap, which can make it difficult to know which stage a person is in.

There are five stages of the disease:

Asymptomatic

On the earliest end of the continuum are people who are asymptomatic (i.e., without symptoms). This means that they may have the biological changes of the disease in their brain but do not show any cognitive symptoms.

Mild cognitive impairment (MCI) due to Alzheimer's

Mild cognitive impairment (MCI) is an early stage of memory loss or other loss of cognitive ability in individuals who can still independently perform activities of daily living. MCI can develop for multiple reasons, and some individuals living with MCI may go on to develop dementia while others will not. MCI can be an early stage of Alzheimer's disease if hallmark changes in the brain, such as beta-amyloid buildup, are present.

Mild dementia due to Alzheimer's disease (early)

If hallmark changes in the brain are present, the person may progress into dementia due to Alzheimer's disease. A person with mild dementia due to Alzheimer's (sometimes referred to as the early stage) will typically start to experience symptoms that interfere with some daily activities.

Moderate dementia due to Alzheimer's disease (middle)

For those with moderate dementia due to Alzheimer's disease (sometimes referred to as the middle stage), biological changes in the brain continue to progress, and symptoms are more pronounced and will interfere with many of the person's daily activities. This is typically the longest stage of the disease and can last for many years.

Severe dementia due to Alzheimer's disease (late)

In this stage (sometimes referred to as the late stage), biological changes in the brain continue to progress. Symptoms are severe and will interfere with most daily activities. People in this stage lose the ability to carry on a conversation, respond to the environment, and, eventually, control movement. Assistance or supervision is required to complete most daily personal care.

Current Alzheimer's statistics

- More than 6 million Americans are living with Alzheimer's disease.
- Alzheimer's kills more than breast cancer and prostate cancer combined.
- One in 3 seniors dies with Alzheimer's disease.

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