

DID YOU KNOW?

The World Health Organization estimates that more than 55 million people around the world are living with dementia. This number is projected to nearly triple to 139 million by 2050 as populations age.

Chapter **1**

Introducing Alzheimer's and Dementia

Alzheimer's disease and dementia both affect the brain, but they're not the same. In this chapter, I define both conditions, explain the differences between them (and normal aging), look at what causes Alzheimer's disease and whether it's hereditary, explore the risk factors of both conditions, and debunk the myths surrounding both.

What Is Alzheimer's Disease?

Alzheimer's disease is a progressive brain disorder that gradually damages a person's memory, their thinking skills, and, over time, their ability to perform everyday tasks. It is the most common cause of dementia (see the next section). Alzheimer's disease is marked by specific abnormal changes in the brain that can be identified with particular types of scans.

Alzheimer's disease often starts in the areas of the brain responsible for memory and then spreads to other regions. As the disease progresses, the brain gradually shrinks and symptoms worsen. People may experience more memory loss, confusion, difficulty speaking or understanding language, and noticeable shifts in mood or behavior.

Although there is currently no cure for Alzheimer's disease, various treatments and forms of support can help ease symptoms and improve quality of life for both individuals and their caregivers.

What Is Dementia?

Dementia is a general term used to describe a group of symptoms that affect memory, thinking, and daily functioning. There are several different types of dementia, but they all occur

when the brain is damaged by disease or injury that interferes with its ability to process information. People with dementia may have trouble remembering things, following conversations, making decisions, or managing everyday tasks. Dementia can also lead to changes in mood, behavior, and personality. Alzheimer's disease is the most common cause of dementia, but there are several other types of dementia as well. These types differ in their underlying causes, how they progress, and the specific symptoms they may cause (see the next section).

What Is the Difference between Alzheimer's Disease and Other Types of Dementia?

Alzheimer's disease has specific characteristics in its presentation, symptoms, and progression. Changes in the brain include the buildup of two types of proteins:

- » **Amyloid:** Amyloid is a protein that can build up between nerve cells. When it builds up, it forms sticky clumps called *amyloid plaques*.
- » **Tau:** Tau is a protein that can become twisted inside cells, where they're known as *tau tangles*.

These changes disrupt how brain cells communicate, eventually causing the cells to become damaged and die.

Other types of dementia include the following:

- » **Vascular dementia:** Vascular dementia is caused by reduced blood flow to the brain, often after stroke. It leads to problems with thinking and movement.
- » **Lewy body dementia:** Lewy body dementia is linked to abnormal protein deposits in the brain. These protein deposits can cause visual hallucinations, sleep issues, and movement changes.
- » **Frontotemporal dementia:** Frontotemporal dementia affects the brain's front and sides. It often results in early personality and language changes.
- » **Mixed dementia:** In mixed dementia, more than one type of dementia occurs together.

In addition, less common forms of dementia are related to Parkinson's disease (often involving movement problems and gradual cognitive decline), Huntington's disease (a genetic disorder causing involuntary movements, mood changes, and dementia), and prion diseases (rapidly progressive conditions caused by abnormal infectious proteins), each with specific underlying causes and symptom patterns.

What Is the Difference between Dementia and Normal Aging?

Normal aging may bring some mild changes in *cognition* (the way a person is able to think and interpret information), like occasional forgetfulness or slower processing speed, but these changes typically don't significantly interfere with daily life.

In contrast, dementia, whether in the form of Alzheimer's disease or other types of dementia, involves a significant decline in cognitive abilities, such as memory, thinking, and reasoning. The decline is severe enough to impair a person's everyday functioning and independence, and the symptoms progressively worsen over time. There are usually specific changes in the brain beyond the *atrophy* (expected shrinkage in brain size) that are seen in normal aging.

What Causes Alzheimer's Disease?

Alzheimer's disease is caused by a combination of changes in the brain over time, most notably the abnormal buildup of two specific proteins: amyloid and tau (see "What Is the Difference between Alzheimer's Disease and Other Types of Dementia?" earlier in this chapter). The results

include an accumulation of disordered nerve cells and fibers called *neurofibrinary tangles*, which interfere with the normal communication and function of brain cells, eventually leading to their death.

The earliest damage often begins in the *hippocampus*, a part of the brain involved in forming new memories. Over time, damage spreads to other areas, affecting thinking, behavior, and physical function. Researchers do not yet understand the cause of the changes, but it's likely a complex interaction between genetic predisposition, aging, and lifestyle or environmental factors.

Is Alzheimer's Disease Hereditary?

Most cases of Alzheimer's disease are not directly inherited, but genetics can play a role in influencing a person's risk. Having a close family member — such as a parent or sibling — with Alzheimer's disease does increase your chances slightly, though it does *not* mean you will definitely develop the disease. This increased risk likely results from a combination of shared genes, lifestyle, and environmental factors.

Particular genes have been identified as influencing risk. The most well-known of these genes is the APOE e4 gene variant, which seems to be more common in people who develop *late-onset Alzheimer's disease* (where the disease

occurs later in life, generally considered over 65 years of age). However, carrying this gene does not guarantee Alzheimer's will develop; it only increases the likelihood.

In less than 1 percent of all cases, Alzheimer's disease is inherited in a clear, familial pattern due to mutations in specific genes such as APP, PSEN1, or PSEN2, often leading to *early-onset Alzheimer's* (in which the disease begins between the ages of 30 and 64).



TIP

Understanding your family history can help inform discussions with a doctor, but it's important to remember that having a genetic risk is not the same as having the disease, and healthy lifestyle choices may still help reduce your overall risk.

What Are the Risk Factors for Alzheimer's Disease?

Age is the most significant risk factor for Alzheimer's disease, with most cases diagnosed in people over the age of 65. However, it's not just aging alone — a range of other risk factors can contribute.

These risk factors include genetic factors; a family history of Alzheimer's disease; and chronic conditions like high blood pressure, diabetes, and obesity, especially if they're poorly controlled in midlife. Smoking, physical inactivity, poor diet, and lack of mental stimulation

can also increase risk. Emerging research also links untreated hearing loss, social isolation, and long-term stress or depression to a higher chance of developing the disease. Importantly, addressing some of these risk factors may help delay or prevent the onset of symptoms.

What Are the Risk Factors for Dementia?

Dementia is a general term for a range of conditions caused by damage to the brain that interferes with memory, thinking, and daily activities. Alzheimer's disease is the most common form, but there are several others, each with different underlying causes. Age and genetics play a role, but many forms of dementia are also linked to lifestyle and health-related factors that affect the brain over time.

For example, vascular dementia is caused by reduced blood flow to the brain, often due to stroke, narrowed arteries, or small vessel disease — frequently as part of more widespread cardiovascular disease. Conditions that harm the heart and blood vessels — such as high blood pressure, diabetes, smoking, high cholesterol, and an unhealthy diet — can increase the risk. These factors may also lead to chronic inflammation and *oxidative stress* (a process in which unstable molecules called *free radicals* damage cells, including those in the brain). Oxidative stress is thought to contribute to the

development and progression of several types of dementia, including vascular dementia and Alzheimer's disease.



TIP

Many of these risk factors are modifiable, meaning steps that improve heart and brain health — such as stopping smoking, eating a healthy diet, and managing blood pressure — can help reduce the risk of oxidative stress, chronic inflammation, cardiovascular disease, and dementia.

What Are the Common Myths about Alzheimer's Disease?

Several myths persist about Alzheimer's disease. One of the most common is the belief that the features of Alzheimer's disease are just a normal part of aging. In reality, although some forgetfulness can occur with age, Alzheimer's disease is a specific disease that causes serious and progressive changes in the brain, leading to memory loss and other cognitive impairments that are not part of normal aging.

Another myth is that only older people can develop Alzheimer's disease. Although age is the biggest risk factor, early-onset Alzheimer's disease can affect people in their 30s, 40s, or 50s.

There is also a widespread perception that nothing can be done after diagnosis, when in fact treatments and lifestyle strategies can help manage symptoms and improve quality of life.

What Are the Common Myths about Dementia?

A common myth about dementia is that all dementia is the same. Dementia is often misunderstood as a single disease, but it's actually an umbrella term for a group of conditions — including Alzheimer's disease, vascular dementia, Lewy body dementia, and frontotemporal dementia — that affect memory, thinking, and behavior. The different presentations, characteristics, challenges, and accompanying physical features of different types of dementia mean that it's important to appreciate those distinctions and how they impact care and therapy needs.