

What is dementia?

Dementia is a syndrome in which there is a decline in mental abilities severe enough to interfere with a person's daily functioning. Memory loss is a common symptom of dementia. Other symptoms include problems with language and communication, inability to focus and pay attention, behavior changes, decreased judgment and reasoning skills, and impaired visual perception. Most dementias are progressive, meaning they gradually worsen over time. Because of this, early diagnosis is important and can maximize the effect of available treatments. If you or someone you know is experiencing problems with memory, thinking, language, judgment, or behavior, see a doctor to determine the cause.

Alzheimer's Disease

Alzheimer's disease (AD) is the most common type of dementia, accounting for 60% - 80% of cases.

In AD, there are deposits of "sticky" proteins in the brain (beta-amyloid plaques) and twisted protein strands inside of brain cells (tau tangles).

Early symptoms include memory problems, as well as apathy and depression. As the disease progresses, it causes impaired judgment, behavior changes, and difficulty speaking or walking.

Vascular Dementia

Vascular dementia accounts for approximately 5% - 10% of dementia cases.

It is caused by blocked blood flow in the brain, usually from a stroke or series of strokes. Brain cells that don't receive blood soon die.

Vascular dementia causes a step-wise rather than a slow, progressive decline. Common symptoms include impaired judgment or ability to plan, confusion, disorientation, and difficulties with speech or vision.

Dementia with Lewy Bodies

Lewy body dementia (LBD) causes 10% - 25% of dementia cases.

In Lewy body dementia, a protein called alpha-synuclein accumulates in the center of brain cells (forming "Lewy bodies") and leads to neuron death.

Symptoms include fluctuations in alertness and attention, visual hallucinations, and motor problems like rigidity and slowed movements.

Frontotemporal Dementia

Frontotemporal dementia (FTD) describes a group of disorders primarily affecting the frontal and temporal lobes of the brain.

Damage to these areas of the brain can cause dramatic changes in personality including inappropriate social conduct, impulsivity, and emotional indifference. The disease can also affect language. The onset of FTD occurs earlier than most dementias (45 - 65 years old).

Other Dementias

Huntington's Disease and Parkinson's Disease: Both of these disorders can cause problems with memory and cognition as they progress.

Creutzfeldt-Jakob Disease: A rare disease causing rapid cognitive deterioration.

Mixed Dementia: A person can have more than one type of dementia simultaneously.

Some dementias don't fit any of these descriptions. With further research, new classifications may emerge.

Research Efforts

The Center for Memory and Aging is a research center based in St. Paul, MN that relies on charitable gifts and grants to conduct nationally recognized research for brain diseases like Alzheimer's and stroke. Our mission is to improve the treatment and prevention of neurologic disorders by advancing scientific knowledge through creative and collaborative research. Here are a few examples of recent discoveries in our lab:

- **Intranasal Delivery:** Our lab has pioneered the development of intranasal delivery, or the delivery of drugs through the nose. Most drugs can't enter the brain through the blood stream due to a protective mechanism known as the *blood brain barrier*. Intranasal delivery bypasses the blood brain barrier because drugs travel directly from the nose to the brain without entering the blood. Delivering drugs through the nose targets drugs to the brain, and also decreases side effects.
- **Intranasal Deferoxamine (DFO):** Degenerative brain diseases like Alzheimer's are marked by accumulation of metals in the brain. DFO is a drug that interacts with some of these metals and helps fix these abnormalities. Our lab has found that intranasal DFO may be beneficial in Alzheimer's disease, as well as stroke and Parkinson's disease.
- **Essential Oils:** People with dementia often have anxiety, irritability, and sleep disruptions. Aromatherapy uses fragrant plant extracts (essential oils) to improve mood. In a recent study, our lab found that lavender oil treated sleep problems in people in assisted-living settings. On average, lavender oil increased sleep time by 42.5 minutes.
- **Minnesota Memory Project:** The MN Memory Project is a long-term observational study that collects information on memory changes associated with aging in the presence and absence of brain disease. Understanding how memory changes with age can help identify ways to make earlier diagnoses, identify risk factors or memory loss, and develop programs to prevent it.
- **Brain Bank Program:** The Brain Bank Research Program has been operated by our Center for more than 30 years. It is one of the world's largest collections of brain tissue, and contributes to research on the neurochemistry, physiology, and diagnosis of dementing illnesses. To date, the Brain Bank Research Program has resulted in a number of important publications and findings. We believe the Brain Bank will continue to play a critical role in unlocking the mystery behind Alzheimer's disease and other dementing illnesses.

What else can cause memory loss?

Dementia is not the only cause of memory loss. If you or a loved one has memory concerns, consult a doctor to rule out other potential causes of memory problems.

- Nutritional deficiencies, especially vitamin B12 deficiency
- Chronic stress, depression, or sleep deprivation
- Certain medications or combinations of medications
- Abnormal hormone levels, especially thyroid hormones
- Infections that affect the brain and spinal cord, such as HIV, tuberculosis, or syphilis
- Head injury (either a single severe injury or chronic smaller injuries)
- Excessive drinking can cause a condition called Korsakoff syndrome, a form of alcohol-induced dementia

What is normal aging?

It's normal to experience a mild decline in memory as we age, but the serious mental decline seen in dementia is not part of normal aging. Normal forgetfulness might include things like forgetting where the car is parked, or forgetting a person's name but remembering it later. More serious signs that might indicate a disease include forgetting how to drive a car or read a clock, forgetting an entire experience or recent events, forgetting ever having known a particular person, or loss of function.



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