DIVISION OF DEVELOPMENTAL DISABILITIES SERVICES

Developmental Delays

"Alzheimer's Disease and Developmental Disabilities"

Serving People with Disabilities in Community Settings

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Did you know ...

The Warning Signs for Alzheimer's Disease:

- Short term memory loss
- Difficulty performing familiar tasks
- Problems with language
- Disorientation to time and place
- Poor or impaired judgment
- Misplacing things
- Change in mood and behavior
- Change in personality
- Problem with abstract thinking
- Loss of initiative

How Alzheimer's Disease is Diagnosed:

There is no single test for the diagnosis of Alzheimer's Disease

- Complete history and physical
- Mental status exam
- Neurological exam
- Lab work
- CAT scan, MRI PET scan
- Psychological exams

Aging issues that May Mask Alzheimer's Disease in Adults with Down Syndrome:

- Visual and hearing impairments
- Thyroid disorders
- Depression
- Physical health problems
- Medication effects

What is Alzheimer's Disease?

Alzheimer's disease is an irreversible, progressive brain disease that slowly destroys memory and thinking skills, and eventually even the ability to carry out the simplest tasks. In most people with Alzheimer's, symptoms first appear after age 60.

Alzheimer's disease is neither a normal part of the aging process nor is it a "hardening of the arteries." It is marked by a gradual decline in brain function that gets worse with time. It used to be assumed that this change was a normal part of aging that we called "senility."

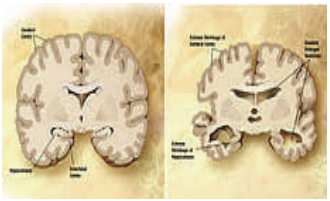
Some persons develop this condition when they are as young as 40 years of age. However, the disease is most common in persons over the age of 65. It is estimated that approximately 10 percent of persons over 65 years of age may have Alzheimer's disease and that in persons over the age of 85, up to 50 percent may be affected. Estimates vary, but experts suggest that as many as 5.1 million American's and 26.6 million worldwide may suffer from Alzheimer's.

Alzheimer's Discovery

Alzheimer's disease is named after Dr. Alois Alzheimer. In 1906, Dr. Alzheimer noticed changes in the brain tissue of a woman who had died of an unusual mental illness. Her symptoms included memory loss, language problems, and unpredictable behavior. After she died, he examined her brain and found many abnormal clumps (now called amyloidal plaques) and tangled bundles of fibers (now called neurofibrillary tangles). Plaques and tangles in the brain are main features of Alzheimer's disease.

The Possible Cause(s) of Alzheimer's

Scientists do not yet fully understand what causes Alzheimer's disease, but it is clear that it develops because of a complex series of events that take place in the brain over a long period of time. It is likely that the causes include genetic, environmental, and lifestyle factors. Because people differ in their genetic make-up and lifestyle, the importance of these factors for preventing or delaying Alzheimer's differs from person to person. Despite the lack of certainty regarding the causes of Alzheimer's, there are three major genetic opposing hypotheses:



The oldest theory, on which most currently available drug therapies are based, is the cholinergic hypothesis, which proposes that Alzheimer's is caused by reduced synthesis of the neurotransmitter acetylcholine.

The cholinergic hypothesis has not maintained widespread support, largely because medications intended to treat acetylcholine deficiency have not been very effective. Other cholinergic effects have also been proposed, for example, initiation of large-scale aggregation of amyloidal, leading to generalized neuroinflammation.

In 1991, the amyloidal hypothesis postulated that amyloid beta (Aβ) deposits are the fundamental cause of the disease. Support for this postulate comes from the location of the gene for the amyloid beta precursor protein (APP) on chromosome 21, together with the fact that people with Trisomy 21 (Down Syndrome) who thus have an extra gene copy almost universally exhibit AD by 40 years of age.

In 2009, this theory was updated, suggesting that a close relative of the beta-amyloid protein, and not necessarily the beta-amyloid itself, may be a major culprit in the disease. The theory holds that an amyloid-related mechanism that prunes neuronal connections in the brain in the fast-growth phase of early life may be triggered by aging-related processes in later life to cause the neuronal withering of Alzheimer's disease.

A 2004 study found that deposition of amyloid plaques does not correlate well with neuron loss. This observation supports the tau hypothesis, the idea that tau protein abnormalities initiate the disease cascade. In this model, hyperphosphorylated tau begins to pair with other threads of tau. Eventually, they form neurofibrillary tangles inside nerve cell bodies. When this occurs, the microtubules disintegrate, collapsing the neuron's transport system. This may result first in malfunctions in biochemical communication between neurons and later in the death of the cells. Herpes simplex virus type 1 has also been proposed to play a causative role in peo-

ple carrying the susceptible versions of the affected gene.

In addition to the purely genetic explanations for contracting Alzheimer's consideration of diet, physical activity, social engagement, and mentally stimulating suggests the possibility that these factors also might impact the risk of cognitive decline and Alzheimer's disease.

Scientists are investigating associations between cognitive decline and vascular and metabolic conditions such as heart disease, stroke, high blood pressure, diabetes, and obesity. Understanding these relationships and testing them in clinical trials will help the medical community understand whether reducing risk factors for these diseases may help with Alzheimer's as well.

Alzheimer's Diagnosis

Alzheimer's disease can be definitively diagnosed only after death by linking clinical course with an examination of brain tissue and pathology in an autopsy. But doctors now have several methods and tools to help them determine fairly accurately whether a person who is having memory problems has "possible Alzheimer's disease" (dementia may be due to another cause) or "probable Alzheimer's disease" (no other cause for dementia can be found). To diagnose Alzheimer's, doctors:

- ask questions about the person's overall health, past medical problems, ability to carry out daily activities, and changes in behavior and personality
- conduct tests of memory, problem solving, attention, counting, and language
- carry out medical tests, such as tests of blood, urine, or spinal fluid
- perform brain scans, such as computerized tomography (CT) or magnetic resonance imaging (MRI)

These tests may be repeated to give doctors information about how the person's memory is changing over time. Early diagnosis is beneficial for several reasons. Having an early diagnosis and starting treatment in the early stages of the disease can help preserve function for months to years, even though the underlying disease process cannot be changed. Having an early diagnosis also helps families plan for the future, make living arrangements, take care of financial and legal matters, and develop support networks.

In addition, an early diagnosis can provide greater opportunities for people to get involved in clinical trials. In a clinical trial, scientists test drugs or treatments to see which are most effective and for whom they work best.

Alzheimer's Signs and Symptoms

The Alzheimer's disease process begins as many as 10 to 20 years before any problems are evident. Tangles begin to develop in an area called the entorhinal cortex, and plaques form in other areas, causing healthy neurons to work less efficiently. As the death of neurons increases, affected brain regions begin to shrink. By the final stage of Alzheimer's, damage is widespread and brain tissue has shrunk significantly.

Memory problems are one of the first signs of Alzheimer's disease. Some people with memory problems have a condition called amnestic mild cognitive impairment (MCI). People with this condition have more memory problems than normal for people their age, but their symptoms are not as severe as those with Alzheimer's.

As Alzheimer's disease progresses, memory loss continues and changes in other cognitive abilities appear. Problems can include getting lost, trouble handling money and paying bills, repeating questions, taking longer to complete normal daily tasks, poor judgment, and small mood and personality changes. People often are diagnosed in this stage.

In the moderate stage, damage occurs in areas of the brain that control language, reasoning, sensory processing, and conscious thought. Memory loss and confusion increase, and people begin to have problems recognizing family and friends. They may be unable to learn new things, carry out tasks that involve multiple steps (such as getting dressed), or cope with new situations. They may have hallucinations, delusions, and paranoia, and may behave impulsively.

By the final stage, plaques and tangles have spread throughout the brain and brain tissue has shrunk significantly. People with severe Alzheimer's cannot communicate and are completely dependent on others for their care. Near the end, the person may be in bed most or all of the time as the body gradually shuts down.

Alzheimer's and Down Syndrome

People with Down syndrome have higher rates of Alzheimer's disease. A growing body of research suggests that people with Down syndrome also experience premature aging, perhaps as many as 20 years earlier than other adults. Not all adults with Down syndrome will exhibit Alzheimer's disease - some may grow old free of any symptoms - and die of other causes.

Although about 20 to 40 percent of adults with Down syndrome show the behavioral symptoms of dementia, upon autopsy nearly all older adults with Down syndrome show the brain changes or neuropathology associated with Alzheimer's disease. Men and women seem to be equally susceptible. The progression of the disease takes, on the average, about eight years - somewhat less time than among persons in the general population. The nature of the disease course generally mirrors that of other people, but is compressed due to the shorter longevity of adults with Down syndrome.

The symptoms of the disease sometimes are expressed differently among adults with Down syndrome. For example, at the early stage of the disease, memory loss is not always noted, and not all symptoms ordinarily associated with Alzheimer's disease will occur. Generally, first observed are changes in activities of daily living skills, and in some adults late-onset seizures may occur. Cognitive changes may also be present, but they are often not readily apparent, or initially they may be ignored because of limitations in the individual's general functional level.

With the exception of adults with Down syndrome, adults with IDs are at the same risk for Alzheimer's disease and related dementias as are other adults in the general population.

Supporting Families and Caregivers

Caring for a person with Alzheimer's disease can have high physical, emotional, and financial costs. The day-to-day care, changing family roles, and difficult decisions about placement in a care facility can be hard to handle. Becoming well-informed about the disease is one important long-term strategy. Developing good coping skills and a strong support network of family and friends also are important ways that caregivers can help themselves handle the stresses of caring for a loved one.

Some Alzheimer's caregivers have found that participating in a support group is a critical lifeline. These support groups allow caregivers to find respite, express concerns, share experiences, get tips, and receive emotional comfort. For more information about at-home care giving, see Caring for a Person with Alzheimer's Disease: Your Easy-to-Use Guide from the National Institute on Aging at *www.nia.nih.gov/Alzheimers/Publications/CaringAD*.