

NIH News in Health

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Can We Prevent Alzheimer's Disease? Research Provides New Leads

Will doing crossword puzzles prevent memory loss as we age? Does exercise delay or prevent Alzheimer's disease? Will adding fish oil to a diet help keep our brains healthy as we age? NIH recently convened a conference to answer these and other questions. The conclusion? Research so far has offered good leads about preventing Alzheimer's disease and age-related **cognitive** decline. Still, more research is needed before we can be sure what's effective.

"Scientists are actively investigating a wide range of strategies," says Dr. Richard J. Hodes, director of NIH's National Institute on Aging (NIA). "Before we can tell the public that something will prevent Alzheimer's disease or cognitive decline, we want to make sure that the intervention is tested as rigorously as possible."

Alzheimer's disease usually affects people 60 and older, but people with a rare form of the illness can develop the disease in their 30s or 40s.

"The biggest risk factor for Alzheimer's disease is age, and the number of Americans over the age of 65 is expected to double to 70 million by 2050," Hodes says. "We must find ways to prevent or delay this terrible disease."

While aging brains may not store memories or recall information as easily as they once did, many older people function well despite these changes. In fact, experience can help some older people perform certain tasks as well or better than younger ones. Alzheimer's disease and other dementias are definitely not, as people once thought, a normal part of aging.



The science of Alzheimer's disease has come a long way since 1906, when a German neurologist and psychiatrist named Dr. Alois Alzheimer first described the key features of the disease now named after him. He noticed abnormal deposits in the brain of a 51-year old woman who had **dementia**. Researchers now know that Alzheimer's disease is characterized by brain abnormalities called

plaques and tangles. Plaques are clumps of protein in the spaces between the brain's nerve cells. Tangles are masses of twisted protein threads found inside nerve cells. Scientists know what these plaques and tangles are made of. But they still don't know what causes them to form, or how to stop the process.

During the 3-day meeting—called the State-of-the-Science Conference on Preventing Alzheimer's Disease and Cognitive Decline—an independent panel of 15 medical, science and

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Definitions

Cognitive

Related to the ability to think, learn and remember.

Dementia

Loss of thinking, memory and reasoning skills that seriously affects your daily activities.

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health care experts heard talks from leading scientists and reviewed the available evidence.

The panel noted the challenges in diagnosing and treating these complex disorders. It's hard to measure them in their earliest stages. There are no agreed-upon tests that doctors can use in their offices. Scientists are continuing to investigate methods for early detection.

A handful of approved medications are available to help treat the symptoms of Alzheimer's disease. One, donepezil (Aricept), was found to delay the development of Alzheimer's disease for about a year in people with mild impairment. None of the approved medications, however, appears to affect the underlying causes of the disease.

The panel reviewed a range of **observational studies** and a few short-term **clinical trials** looking at different prevention strategies. For example, these studies have suggested that physical activity, social engagement and intellectual activity all may help prevent Alzheimer's dis-



Definitions

Observational Studies

Studies in which scientists observe people to learn more about the cause or progression of a disease or condition.

Clinical Trials

Studies in which researchers test a particular treatment.



Web Links

For more about Alzheimer's disease and cognitive decline, see our links online:

<http://newsinhealth.nih.gov/issue/Jul2010/Feature1>

ease and cognitive decline. Controlling high blood pressure and diabetes may help. So may omega 3 fatty acids, which are found in salmon and other fish. Many of these strategies have already been shown to promote healthy aging and reduce the risk for other diseases.

However, none of the studies to date has given conclusive answers when it comes to preventing Alzheimer's or cognitive decline. These strategies and many others are under further study. In addition, many drugs are now being tested in clinical trials.

"We wish we could tell people that taking a pill or doing a puzzle every day would prevent this terrible disease, but current evidence doesn't support this," says Dr. Martha L. Daviglus, panel chair and professor of preventive medicine at Northwestern University in Chicago.

Still, many of the healthy habits under study, like exercise, usually do no harm and likely benefit overall health. Smoking has been linked to a greater risk for dementia and cognitive decline, so if you smoke, try to quit. Chronic diseases, such as diabetes and depression, may also raise your risk, so be sure to address any long-term health problems.

Despite all the challenges, Hodes says, there are reasons to be optimistic. "Technology is advancing our



Wise Choices For Healthy Aging

No treatments or drugs have yet been proven to prevent or delay Alzheimer's disease and cognitive decline. But these healthy lifestyle choices and behaviors may help the aging brain:

- Exercise regularly.
- Eat a healthy diet that is rich in fruits and vegetables.
- Engage in social and intellectually stimulating activities.
- Control type 2 diabetes.
- Reduce high blood pressure and blood cholesterol levels.
- Maintain a healthy weight.
- Don't smoke.
- See a doctor about mental health issues, such as depression.

ability to identify the gene mutations that may place some people at greater risk for developing Alzheimer's disease. Scientists are developing new imaging tools to allow us to map the changes taking place in living brains. And we are moving closer to identifying the markers in blood that may signal disease onset, track its progress and test whether or not a medicine is working."

Whether you have memory problems or not, you can take an important step: You can volunteer to participate in research. NIA is now funding 6 clinical trials to examine the effects of exercise or other lifestyle changes on people with mild to severe Alzheimer's disease. Another 14 clinical trials are testing ways to prevent cognitive decline in healthy older adults.

For more information and to volunteer for an open trial, go to www.nia.nih.gov/Alzheimers/ResearchInformation/ClinicalTrials. ■

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Mind Your Mouth

Preventing Gum Disease

If you have it, you're not alone. Many adults nationwide have some form of gum disease. It can simply cause swollen gums or give you bad breath. It can also ruin your smile or even make you lose your teeth. The good news is that gum disease can be prevented with daily dental care.

The problem begins with bacteria. Our mouths are packed with these tiny microbes. They combine with mucus and other particles to form a sticky, colorless film—called **plaque**—on our teeth. Brushing and flossing can get rid of some plaque. But any that remains can harden and form **tartar**, a yellowish deposit that can become rock-hard.

Plaque and tartar buildup can lead to gum disease—technically known as periodontal disease. The most common and mild type of gum disease is called gingivitis. The gums become red and swollen, and they can bleed easily. Daily brushing and flossing and regular cleanings by dental professionals can usually clear up gingivitis.

If gingivitis is not treated, it can become a more severe type of gum disease called periodontitis. Symptoms of periodontitis include

bad breath that won't go away; gums that are red, swollen, tender or bleeding; painful chewing; and loose or sensitive teeth.

In periodontitis, the gums pull away from the teeth and form "pockets" that become infected. Bacterial toxins and your body's natural response to infection start to break down the bone and soft tissues that hold teeth in place. If not treated, the tissues will be destroyed. Your teeth may eventually become loose and have to be removed. If you have periodontitis, your dentist may recommend a deep-cleaning method called scaling and root planing. In more severe cases, you may need surgery.

Most people don't show signs of gum disease until they're in their 30s or 40s. But getting older doesn't necessarily mean you'll get gum disease. Daily dental care and regular visits to your dentist can reduce your risk of gum disease.

Smoking greatly increases your risk for periodontitis—another reason not to smoke. Other factors that boost your risk include hormonal changes in women, certain medications and some illnesses like diabetes, cancer and AIDS.

NIH-supported researchers are working to learn more about preventing and treating gum problems. Some are exploring whether **stem cells** might help to restore damaged tissues that support the teeth. Others are searching for **genes** and proteins



produced by our bodies and by the bacteria in our mouths to see how they interact to affect gum health.

Some studies suggest that gum disease may increase the risk of heart attack or stroke or cause other health problems. But so far, it hasn't been confirmed that gum disease contributes to these conditions.

Although many aspects of gum disease are still being investigated, one thing is clear: controlling gum disease can save your teeth. That alone is an excellent reason to take good care of your teeth and gums every day. ■

Definitions

Plaque

Sticky, colorless film on your teeth that brushing and flossing help control.

Tartar

Hard yellowish deposits on teeth that can be removed only by a dentist or hygienist.

Stem Cells

Immature cells that have the potential to develop into many different cell types in the body.

Genes

Stretches of DNA, a substance you inherit from your parents.

Web Links

For more about caring for your teeth and mouth, see our links online:

<http://newsinhealth.nih.gov/issue/Jul2010/Feature2>



Wise Choices To Prevent Gum Disease

- Brush your teeth twice a day with a fluoride toothpaste.
- Floss every day.
- Visit the dentist routinely for a check-up and professional cleaning.
- Don't smoke.

Health Capsules

For links to more information, see these stories online:
<http://newsinhealth.nih.gov/issue/Jul2010/Capsule1>

Infants Can Learn While Sleeping

Snoozing newborns may have more going on than you think. Even when asleep, babies are capable of a simple form of learning, a new study shows.

Since newborns spend most of their time sleeping, scientists have long wondered if some learning occurs during slumber. Researchers recently discovered that newborns can process some outside information while they're asleep—for example, sounds of speech.

To see whether newborns could learn about relationships between events while sleeping, NIH-funded

researchers studied 1- or 2-day-old infants. The scientists repeatedly played a brief musical tone followed by a faint puff of air to each sleeping infant's eyelids. The babies scrunched their faces when they felt the puff. After several repeats, the researchers played a tone without the air puff.

After about 20 minutes, the tones made most infants (24 out of 26) scrunch their faces even without the puff of air. Infants who were exposed to random, unpaired tones and air puffs didn't squeeze their eyelids in response to isolated tones.

In addition, after the babies had been exposed to the paired tones and air puffs, their brain wave activity showed some changes when the tone sounded. The researchers interpret this as further evidence that the sleeping infants had learned to link the tone to the air puff.

The researchers say that this is the first study to demonstrate that newborn infants are capable of learning about relationships between events while asleep. It's still unknown whether this quality is unique to infants or could also occur in older children and adults. ■

Gene Pattern Spells Freedom from Medications

Most patients who've received a kidney transplant have to take special drugs—called immunosuppressants—for the rest of their lives. Otherwise, their body's own **immune system** will attack and destroy the transplanted organ.

In rare cases, a transplant survives even after the patient stops taking medications. NIH-funded scientists have now analyzed **gene** activity in immune cells from these unusual patients and discovered a distinctive pattern. The finding may help identify other transplant recipients who could safely reduce or end their use of harsh drugs that block rejection.

Two independent research teams studied over 35 patients whose kidney transplants survived without immunosuppressants. Both teams identified an activity pattern in 3 genes that was far more common

in these patients than in transplant recipients who still took the drugs.

Larger studies will be needed to see if the pattern can reliably identify patients who could be safely weaned off their drugs. The researchers stress that transplant patients should never consider reducing or changing their medication regimen unless under the direct supervision of a physician. ■

Definitions

Immune System

The system that protects your body from invading bacteria and other microscopic threats.

Gene

Stretches of DNA, a substance you inherit from your parents, that define characteristics such as how your immune system works.



Featured Web Site

Advances in Colorectal Cancer Research

www.nih.gov/science/colorectalcancer

Colorectal cancer is the second-leading cause of cancer death in the United States. More widespread screening has helped reduce the incidence of colorectal cancer by more than one-third over 20 years. Learn more about NIH research designed to improve the diagnosis, treatment and prevention of this deadly disease.

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