

# Breakthroughs in Alzheimer's prevention

**A healthy lifestyle and a future treatment for a common virus may reduce risk for Alzheimer's disease**

By Penny Walker, ASU News  
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**By Leah Rosenbaum**

Nearly 7 million Americans are living with Alzheimer's disease, a condition that devastatingly impairs memory and identity. It's a heartbreaking disease that robs loved ones of their sense of self and ability to recognize loved ones.

There's some good news. Research from scientists at Arizona State University shows that there are ways to reduce risk, including through exercise and getting enough of the essential nutrient choline. In addition, a recent breakthrough suggests there may be a connection to a common virus in 25% to 45% of new cases, which may allow the use of medication to prevent the virus from causing damage in the brain.

Dr. [Ben Readhead](#), an associate research professor at the ASU-Banner Neurodegenerative Disease Research Center, has witnessed the toll of Alzheimer's firsthand in his grandfather. This personal experience fuels his dedication to disease prevention research.

## Heading off Alzheimer's by treating a common virus?

Readhead and his team recently published research that illuminated a surprising link between a chronic gut infection caused by a common virus and the development of Alzheimer's disease in many people.

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“We think we found a biologically unique subtype of Alzheimer’s that may affect 25% to 45% of people with this disease,” he says.

Learn more about ASU research at [news.asu.edu/research-matters](https://news.asu.edu/research-matters).

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ASU and Banner Alzheimer’s Institute researchers, along with their collaborators, discovered that some people exposed to cytomegalovirus may have a lingering infection in the gut. This herpes virus infects over half of adults by age 40 and may persist in the gut, traveling to the brain via the vagus nerve — a critical information highway that connects the gut and brain. Once in the brain, the virus may trigger the brain’s specialized immune cells, called microglia.

## Ongoing research

Readhead says they haven’t found clinical differences between people who might have this subtype of Alzheimer’s disease and people who have the more typical form of Alzheimer’s disease, but their clinical data has been limited because most of their research has been conducted on patients after death.

His team is working to develop a blood test that could identify people who have a chronic gut infection while they are still alive, which would help provide a better clinical understanding of the disease and how it might differ in subtle ways from conventional Alzheimer’s disease.

“We are hopeful about the potential for a preventative role for some sorts of therapies,” he says, “maybe antivirals, or maybe it’ll be something else that could strengthen the immune system.”

It’s important to note, however, that contracting cytomegalovirus, or HCMV, doesn’t mean you will get Alzheimer’s disease, and its role in the disease is likely complex. By age 40, half of American adults have been infected with HCMV — but only 10% of Americans age 65 and older will go on to develop Alzheimer’s disease. Most people who contract HCMV will only experience a mild, flu-like illness.

What might be notable, according to the researchers, is whether an HCMV infection lingers for years in the gut, as it did in a subset of their research participants. The presence of the virus in the intestines specifically seemed related to Alzheimer’s disease — but this shouldn’t be a concern for most people.

## Aerobic exercise, nutrition and Alzheimer’s disease

Researchers at ASU have shown that a healthy lifestyle, including exercise and choline, an essential nutrient, reduces risk of the disease.

Professor [Fang Yu](#), Edson Chair in Dementia Translational Nursing Science at the Edson College of Nursing and Health Innovation, says that aerobic exercise may help prevent cognitive decline through a variety of mechanisms in the brain. For example, in animals, aerobic exercise has been shown to reduce amyloid plaques and tau tangles, two hallmarks of the disease.

Aerobic exercise has also been found to improve neuroinflammation and oxidative stress, both of which can lead to cell damage in the brain. It might also increase hippocampal volume, a key part

of the brain that is responsible for memory.

Yu says that it doesn't really matter what type of aerobic exercise people do to reduce cognitive decline.

"They all work through similar mechanisms," she says.

As a nurse, however, she is familiar with working directly with patients and understanding their daily limitations. She has found that recumbent stationary exercise bikes are one of the safest and most effective ways for people with limited mobility or with the beginnings of cognitive decline to get aerobic exercise.

Nutrition may also play a key role in preventing Alzheimer's disease, according to ASU research.

An estimated 90% of Americans don't get enough choline, an essential nutrient produced in small amounts in the liver and found in foods including eggs, broccoli, beans and meat, according to the National Institutes of Health. This compound is necessary for brain health and is used to produce acetylcholine, a neurotransmitter that plays an essential role in memory, muscle control and mood.

Current recommendations are 550 milligrams per day for men and 425 milligrams per day for women. [Ramon Velazquez](#), assistant professor at the ASU-Banner Neurodegenerative Disease Research Center and the School of Life Sciences, published research that shows consuming enough dietary choline may help protect the brain from Alzheimer's disease and cognitive decline.

Velazquez and his colleagues found that multiple organs in mice's bodies were negatively impacted by a choline-deficient diet, while adequate choline showed improvements in spatial memory, compared with those receiving a normal choline regimen. Not only that, but their offspring also showed improvements in spatial memory.

Another study by Velazquez and his colleagues showed that mice deprived of choline exhibited weight gain, changes to their metabolism, organ damage and poor motor function. They also showed brain proteins that could lead to Alzheimer-like tangles.

"Our work provides further support that dietary choline should be consumed on a daily basis given the need throughout the body," Velazquez says.

In humans, Velazquez has found that Alzheimer's patients with lower levels of choline in their blood tend to have more severe forms of Alzheimer's disease pathology in the brain, compared with those with higher amounts of choline. He also found strong associations between low blood choline and higher accumulations of amyloid plaques and tau tangles in the brain.

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## Choline recommendations

**425 mg/day for women, 550  
mg/day for men**

3-ounce serving of fish: 187 mg  
of choline

1 egg: 169 mg

1 cup of shiitake mushrooms:  
116 mg

1 cup of roasted soybeans: 214  
mg

1 cup of broccoli: 72 mg

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The growing awareness of choline's importance should encourage all adults to ensure proper choline intake, Velazquez says. This is particularly true for those on plant-based diets, which may be low in naturally occurring choline, he says.

The researchers encourage people to discuss with their doctor whether to take an inexpensive, over-the-counter choline supplement to help protect the brain from neurodegeneration.

To raise awareness about the importance of lifestyle factors in brain health, Velazquez has partnered with Lifetime Fitness at the Arizona Biltmore to develop a seminar series for adults age 65 and older. The focus is the impact of diet, exercise and other lifestyle choices on cognitive well-being.

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## About the author

A writer and reporter who specializes in health, medicine and science, Leah Rosenbaum previously worked on staff for the Business Insider and Forbes.

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*This story originally appeared on [ASU News](#).*

## Main image



Judy and Doug Newton, residents at Mirabella at ASU, believe that exercise has helped them stay healthy and reduce risk for health challenges. Photo by Sabira Madady/ASU



## Text image(s)



Barbara and Zacc Russell, residents at Mirabella at ASU, include high-choline foods and exercise in their healthy lifestyles. Photo by Sabira Madady/ASU