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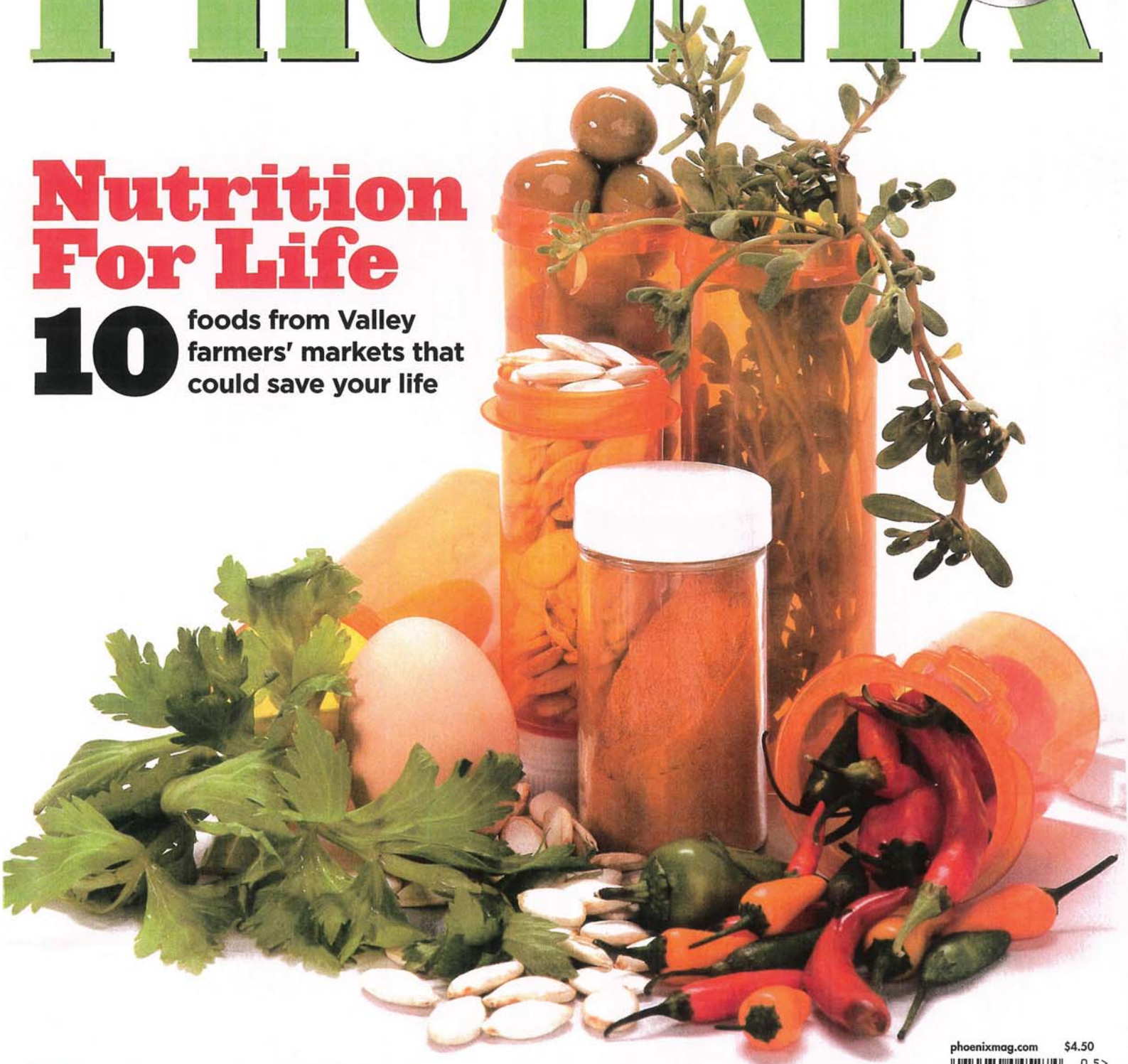

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Brain Matters

Although Alzheimer's is still largely a mystery, Arizona doctors and scientists are leading the way in helping to treat – and someday cure – this emotionally painful disease.

BY STEPHANIE R. CONNER

It's known as the long goodbye. It claims a person's memory and affects thinking and behavior. It's trying for the afflicted – and painful for loved ones.

Alzheimer's disease, the most common form of dementia, was first described in 1906, but as Alfred W. Kaszniak, Ph.D., head of the department of psychology at the University of Arizona explains, it wasn't recognized as a public health concern until the 1970s. Since then, researchers like Kaszniak have worked to understand the causes of Alzheimer's disease to help find a cure.

Today, Arizona, and the Valley in particular, is a hub for research that's bringing the scientific community closer to interventional therapies. And it all starts with the Arizona Alzheimer's Consortium.

The Benefits of Collaboration

The Arizona Alzheimer's Consortium is comprised of about 150 researchers from seven member institutions and three affiliated institutions. The consortium, which takes advantage of each organization's scientific strengths, includes members Arizona State University, Banner Alzheimer's Institute, Barrow Neurological Institute, the Mayo Clinic Arizona, Sun Health Research Institute, the Translational Genomics Research Institute (TGen) and the University of Arizona.

Arizona is recognized nationally – even internationally – for its multidisciplinary, collaborative model, the benefits of which are many. So, how do researchers from sometimes-competing institutions work together so well?

"We try to capitalize on a heightened sense of scientific desperation, encouraging researchers to reach out to their colleagues to address problems in the most fundamental way," says Eric M. Reiman, M.D., director of the Consortium and executive director of the Banner Alzheimer's Institute.

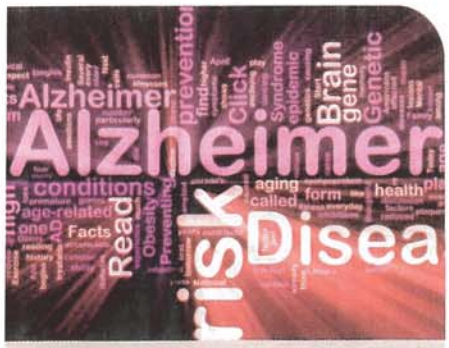
One of their primary goals: "How can we at the very earliest possible time be able to detect changes that might indicate that an individual is... headed toward Alzheimer's disease long before symptoms are affecting that person's day-to-day function?" Kaszniak explains.

The ultimate goal is to find demonstrably effective prevention therapies as soon as possible.

Finding Solutions through Genetics and Imaging

In a well-known study, Arizona researchers have been following people who have a common Alzheimer's susceptibility gene. Using brain imaging techniques and memory and thinking tests, the researchers are able to detect and track the earliest changes involved in the predisposition for Alzheimer's disease. In other studies, they have been capitalizing on sophisticated genetics technology to uncover additional Alzheimer's susceptibility genes.

"We are involved in scanning the genome for new genetic risk factors for Alzheimer's disease," says Matthew Huentelman, Ph.D., an investigator at TGen and the director of the consortium's Genotyping Core. "The ability to take this approach across large numbers of samples is fairly unique to TGen." And it's this kind of technology that helps drive Arizona's contributions to Alzheimer's research.



What You Can Do

While not yet scientifically proven to reduce Alzheimer's risk, there are some steps you can take that may boost your brain health. In his book *The Alzheimer's Answer: Reduce Your Risk and Keep Your Brain Healthy* (John Wiley & Sons, 2008), Marwan Sabbagh, M.D., director of clinical research for Sun Health, offers these and other tips for potentially reducing your Alzheimer's risk – and improving your health overall.

1. Don't smoke.
2. Take care of your heart by keeping cholesterol and blood pressure levels within normal ranges.
3. Eat less saturated fat.
4. Eat more omega-3 fatty acids, like those found in fish, tofu and flax seeds.
5. Eat more fruits and vegetables high in antioxidants, including broccoli, eggplant, spinach, arugula and berries.
6. Consider a Mediterranean diet based on fish, legumes and whole grains.
7. Stay physically active. This means at least 30 minutes of moderate exercise daily.

— *Stephanie R. Conner*

The Apolipoprotein E4 (APOE4) gene is a widely recognized risk factor for Alzheimer's. Richard Caselli, M.D., a professor and the chair of the department of neurology for Mayo Clinic Arizona, explains that we all have two copies of every gene – one from mom and one from dad. Individuals who have one copy of the APOE4 gene have a significantly higher risk for Alzheimer's than those without it, and those with two copies of this gene have an even higher risk.

Since 1994, Caselli, Reiman and their colleagues have been studying "cognitively normal" individuals with two copies, one copy and no copies of the APOE4 gene. In a series of articles, they have characterized the earliest brain changes associated with the risk of Alzheimer's disease, some of which occur in young adults – almost five decades before the onset of symptoms.

Based on these findings, researchers have shown how promising prevention therapies could be tested much more quickly than otherwise possible. In July, they reported the earliest memory changes in those at risk in the New England Journal of Medicine.

"The acceleration in memory decline in the APOE4 carriers is starting at a much younger age than previously thought and suggests Alzheimer's disease research and prevention strategies should refocus on younger individuals – in their 50s and maybe even 40s – than those traditionally targeted (70s and older)," Caselli says.

Demonstrating the strength of the consortium, neuroimaging researcher Leslie Baxter, Ph.D., and her colleagues are now studying some of the same individuals at the Barrow Neurological Institute of St. Joseph's Hospital and Medical Center. This study capitalizes on the institute's specialized strengths in MRI research.

Participation Fuels Research

The Sun Health Research Institute, now part of Banner Health, plays a critical role in Alzheimer's disease research.

The institute, explains Marwan Sabbagh, M.D., the director of clinical research for Sun Health, focuses on central nervous system research. For instance, it was the first to establish the link between Alzheimer's and inflammation – and to suggest anti-inflammatory medications as a potential treatment. Research there also has suggested that high cholesterol may be a risk factor for Alzheimer's.

Perhaps even more significant is its world-renowned tissue bank. The Brain Donation Program is "the engine of our research," Sabbagh

DR. MATTHEW HUENTELMAN HELPS SCAN FOR GENETIC RISK FACTORS FOR ALZHEIMER'S DISEASE AT TGEN IN PHOENIX.

says. "It's so important because we are able to collect people's tissue very [soon after] death. There are 200 requests a year for our tissue because it's so valuable."

Individuals sign up for the program, and scientists follow them for many years, collecting massive amounts of data right up to their death.

This kind of participation is critical, researchers agree. "Everything we do eventually necessitates being able to bring in as collaborators people who participate in research," Kaszniak says.

And, Sabbagh adds, "Things get advanced quicker when people participate in studies. Everybody benefits when we get these trials done more expediently."

A Rallying Cry

The consortium, which was established in 1998, is supported by the National Institute on Aging and is the agency's first statewide Alzheimer's disease center.

The consortium is also supported by the state of Arizona.

"This is a rallying cry for Arizona to realize what's going on and to feel proud about what we're trying to do," Huentelman says. "This is a very unique collaboration, and the resources provided by each participant make it much easier to get down to the business of tackling this disease."

— Stephanie R. Conner
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FIND MORE INFORMATION ABOUT THE ARIZONA ALZHEIMER'S CONSORTIUM AT AZALZ.ORG