



# BAI Beacon

The Newsletter from Family and Community Services

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## The Genetics of Alzheimer's Disease

Family history is a known risk factor for the development of Alzheimer disease (AD) and a common concern expressed by many family members. Because people with a first-degree relative (parent or sibling) with AD have a 10 to 30 percent increased risk of developing the disorder, we know genetics plays a role.

Genetics is one of several variables involved in the development of AD. To best understand the genetics of AD, it is important to distinguish between Late-Onset AD (LOAD) and Early-Onset AD (EOAD). When symptoms of AD present at the age of 65 or later, these patients are considered to have LOAD. When AD presents under the age of 65, these patients are considered to have EOAD. There are differences in the genetics of LOAD and EOAD.

A variety of factors are involved in the development of LOAD such as environmental and lifestyle factors (such as diet and exercise). Because genetics are only one factor in the development of AD, genetic testing cannot accurately predict who will develop disease. The apolipoprotein E (apoE) is a gene that helps determine one's risk of developing AD; it has three common forms:

- ApoE- 2 is relatively rare. It may provide some protection against the disease.
- ApoE- 3 is the most common form. It is thought to neither decrease nor increase the risk for the development of AD.
- ApoE- 4 occurs in 25–30 percent of the population and approximately 40 percent of all people with late-onset AD have this gene. This form of ApoE increases the risk of developing AD; however, the reason for this is unknown.

If a person has one copy of ApoE- 4, then that individual will have a three times greater risk of developing AD than a person without this specific gene. If a person has two copies of ApoE- 4, then this individual will have a 15 times greater risk of developing AD.

Although the ApoE- 4 allele increases the risk of developing AD, it does not mean that developing AD is inevitable. Some people with one or two ApoE- 4 alleles never get the disease, and others who develop AD do not have any APOE- 4. Knowledge of the apoE status does not change medical management of the patient with AD. For these reasons, testing for the ApoE gene (via a simple blood test) is generally not recommended in clinical practice. It is, however, often tested in AD research protocols to examine if there are different responses to study drugs between patients with the APOE- 4.

(Continued)



## Brain Health Tip:

Enhance TV watching by selecting game shows that you can play along. Watch the news and when the program is over, review the topics covered. Listen for words that are unfamiliar and then look them up in the dictionary.

## Beacon Bits

### First Friday Making Music, Making Memories Session

Friday, Sept. 7, 10 – 11:30 a.m.  
Pyle Adult Recreation Center  
655 E. Southern Ave., Tempe

Registration: (602) 839-6850;  
Deidra.Colvin@bannerhealth.com

Banner Health  
901 East Willetta Street  
Phoenix, AZ 85006

Banner Alzheimer's Institute



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With regards to EOAD, some of these patients who have a strong family history of EOAD carry a specific rare genetic mutation, accounting for less than 1 percent of all cases of AD. These mutations are found in the following genes: amyloid precursor protein (APP), presenilin 1 (PS-1), and presenilin 2 (PS-2). Each biological child of a patient with one of these rare genetic mutations has a 50 percent chance of inheriting the gene. If indeed the gene is inherited, that individual almost surely will develop EOAD. Predictive testing for family members of affected individuals is possible, but can be costly. It is a personal choice, which should be done in a setting that allows for informed consent, genetic and psychological counseling, and confidentiality.

The National Institutes of Health/National Institute on Aging ([www.nia.nih.gov/alzheimers](http://www.nia.nih.gov/alzheimers)) suggests that scientists continue to learn more about the genetics of AD in order to:

- Answer questions, such as: How does the disease process begin? Why do some people with memory and other thinking problems develop AD and others don't?
- Find out how risk-factor genes interact with other genes and environmental/lifestyle risk factors to affect AD risk.
- Identify people who are at the highest risk for developing AD so they can benefit from new interventions and treatments as soon as possible.
- Focus on new prevention and treatment approaches.

The Alzheimer's Prevention Initiative (API), sponsored by Banner Alzheimer's Institute (BAI), will in part use genetic testing to target treatment toward those at greatest risk of developing AD in order to find effective ways to prevent AD as quickly as possible. To learn more about the API and stay connected, visit [www.endalznow.org](http://www.endalznow.org).



## Ask The Expert

Roy Yaari

Dear Dr. Yaari:

I have a long family history of Alzheimer's disease (AD) in my family. Since I can't change my genetic makeup, is there anything else I can do to prevent or delay AD?

Signed:  
At Risk

Dear At Risk:

Unfortunately, at this time, not enough data is available to provide concrete recommendations regarding preventing or delaying Alzheimer's disease (AD), although there is emerging data on how to reduce risk factors. Data suggests eating a healthy diet, exercising regularly, remaining engaged in social activities, and keeping the brain active through mental activity could potentially lower the risk of developing AD.

A healthy diet could include foods low in cholesterol, saturated fat, sugar, and salt. It is generally recommended to eat foods that are high in fiber (fruits, vegetables, whole wheat products). In particular, fruits that contain antioxidants, vitamin E, and beta-carotene are recommended such as blueberries, grapes, green leafy vegetables, and others. Beneficial fats such as omega-3 fatty acids can be found in fish and could help prevent build-up of atherosclerotic plaques in blood vessels of the heart and brain. There has recently been some data emerging on the so-called "Mediterranean Diet" which is low in saturated fat and high in beneficial fats and fiber.

Regular exercise can include 30 minutes of brisk walking most days of the week, which is good for the heart and brain by promoting blood flow to these vital organs. Aside from walking, other activities could include weight lifting, sports, hiking, and dancing.

Social activity with friends and family may lower risk of AD as well. Socializing stimulates the brain, and decreases the risk of depression. Social activity could be through a religious organization, club, employment, or volunteering.

Keeping your brain active can potentially preserve brain activity. This could be as simple as participating in a book club (which is also social engagement) or more complicated activities such as learning a new instrument or language. Brain activity can also include card games or math/language puzzles. I generally advocate that people choose mental activities that they enjoy, and are not an additional burden. I strongly advocate limiting television time. It is generally recommended to include a variety of brain activities that are new and challenging.

Other suggestions to reduce risk factors for AD include limiting alcohol intake to one or two drinks per day. Some data suggests that small amounts of red wine might decrease the risk of AD. (Resveratrol, a component of red wine is being studied in clinical trials at this time as a possible therapeutic agent for treatment of AD). Additionally, reducing weight (if overweight), cessation of cigarette smoking, stress reduction, and controlling high blood pressure and diabetes may also reduce AD risk factors.

Until we have more concrete data on what can prevent AD, we use our limited data and common sense to recommend reducing risk factors through diet, exercise, brain activity, and overall a happy, healthy lifestyle.

Have a question?  
To submit your question for future consideration email us at  
[baiinfo@bannerhealth.com](mailto:baiinfo@bannerhealth.com)

### GPS (Giving People Strategies for Memory Lecture): Practical Solutions for Problems in Dementia

Friday, Sept. 14, 10:30 a.m. – noon  
Rio Vista Recreation Center  
8866 W. Thunderbird Road, Peoria  
Registration: (602) 230-CARE

### COMPASS for Caregivers (Caregivers Of Memory-impaired Persons Acquiring Successful Strategies)

Thursday, Sept. 20, 10 – 11:30 a.m.,  
Monday, Sept. 24, 4 – 5:30 p.m.  
Banner Alzheimer's Institute,  
Third Floor Conference Room  
901 E. Willetta St., Phoenix

OR

Wednesday, Sept. 12, 6 – 7:30 p.m.  
Tempe Public Library  
3500 S. Rural Road, Tempe  
Registration: (602) 839-6850;  
[Deidra.Colvin@bannerhealth.com](mailto:Deidra.Colvin@bannerhealth.com)

### Free Memory Screening Event

Monday, Sept. 17, 9am – 1pm  
Pyle Adult Recreation Center  
655 E. Southern Ave., Tempe  
20-minute appointments.  
Registration required:  
(602) 230-CARE

### Our Mission

To end Alzheimer's disease without losing a generation, to set a new standard of care for patients and their families, and to forge a model of collaboration in biomedical research.