



Recommendations for Dementia Risk Reduction

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The Yassine lab specializes in how changes in lipid metabolism and nutrition affect the brain and the risk of developing Alzheimer's disease (AD). The lab has a specific interest in studying how carrying the *APOE4* allele, the strongest genetic risk factor for developing AD, and diabetes affect brain lipid metabolism and the response to diet. Our approach combines basic science, clinical trials, and brain imaging studies.

Dementia is a syndrome that leads to deteriorations in cognition beyond what we expect from normal aging. It affects cognitive functions such as memory, thinking, language, problem-solving, and decision-making severe enough to interfere with daily life. Alzheimer's disease is the most common type of dementia that affects memory, thinking, and behavior. Its symptoms usually develop slowly and worsen over time.

APOE is a gene containing instructions that allow our body to make apolipoprotein E, a protein that helps control the level of cholesterol and fats in our blood and in the brain. There are three variants of the gene: E2, E3, and E4. We each carry two copies of this gene, one from each parent. The E4 copy is a risk factor for Alzheimer's disease and the risk differs by race. In whites, one copy of E4 is associated with a 25% lifetime risk of AD. Two copies of *APOE4* cause a further increased risk to as high as 55% by age 85. In other words, if you have two copies of the E4 variant, you have an increased risk of developing AD. If you have one copy of the E4 variant, you are at a slightly increased risk of developing AD. If you do not have any E4 variant, you are at low risk for developing AD. However, you may still be at risk of developing AD because other factors can influence your risk.

The risk of dementia in *APOE4* carriers is modifiable, particularly if risk reduction strategies are started early. Here, we provide some recommendations based on lifestyle for maintaining cognitive function or slowing down cognitive decline in persons at risk of dementia, such as in *APOE4* carriers.

We caution that these recommendations are not all based on clinical trial evidence, as such evidence is still lacking. Although these recommendations are supported by high-quality research, they do not replace seeking medical advice or guarantee health outcomes.

We also emphasize the importance of targeting dementia risk factors in midlife, decades before the onset of dementia.

Diet
Eat a diet high in vegetables and healthy fats and low in simple sugars
<ul style="list-style-type: none"> • Green leafy vegetables (<i>spinach, kale, and broccoli</i>) • Fruits (<i>berries, apples, oranges, and grapes</i>) • Fish containing dietary omega-3 fatty acids DHA and EPA (<i>salmon, sardines, lake trout, tuna, and whitefish</i>) at least one serving per week • Consumption of other omega-3 rich food (<i>Flax seeds and flax seed oil, walnuts, seaweed, green leafy vegetables, tofu, and soybean</i>) • Limiting the consumption of simple refined sugars and increasing the consumption of plant fats (avocado, olive oils) • <u>Avoid</u> excessive alcohol intake which can cause cognitive impairment and increase risk of dementia.
Address chronic illnesses during mid-life
Address chronic conditions that increase the risk of cognitive decline (chronic inflammation)
<ul style="list-style-type: none"> • Learn about medical condition(s) particular during mid-life that increase dementia risk: <ul style="list-style-type: none"> ○ Depression, diabetes, elevated cholesterol, environmental exposure to toxins, head trauma, heart disease, hypertension, obesity, sensory (vision or hearing) problems, sleep disorders, transitory ischemic attacks, and vitamin B₁₂ deficiency • Maintain a healthy weight • Smoking Cessation • Dental care (gum disease is associated with chronic inflammation)
Avoid conditions associated with brain trauma
<ul style="list-style-type: none"> • Contact sports • Falls
Address depression, anxiety, grief, and loneliness
<ul style="list-style-type: none"> • Limit the number of hours spend alone and socially isolated • Participate in group activities that provide opportunities for social interactions (<i>teach, mentor, social activism, work, volunteer, and network</i>) • Engage in mentally stimulating activities or group activities
Coping with Stress
<ul style="list-style-type: none"> • Regularly practice relaxation techniques such as mindfulness meditation • Exercise regularly • Seek advice from friends, family, or counselors • Music and/or prayer
Education and Activity
Engage socially and intellectually
<ul style="list-style-type: none"> • Remain active with volunteering, working parttime, or a new career path • Engage in mentally stimulating activities (<i>enroll in adult education courses, learn a new skill, read books, and learn a new language</i>)

Sleep

Average individual needs 7-8 hours of sleep per night

- Maintain regular bed and wake time schedule
- Establish a bedtime routine (eat at least 2-3 hours before bedtime and avoid exercising at least 3 hours before bedtime)
- Do not over-use sleep pills and do not induce sleep with alcohol intoxication
- Work with your doctor to treat sleep-disordered breathing

Exercise

Adults are recommended to engage in moderate-intensity aerobic exercise for at least 150 minutes per week

- Aerobic training (*aerobics, aqua aerobics, bicycling, brisk walking, climbing stairs or hills, dancing, hiking, jogging, martial arts, racquet sports, skiing, swimming, and yard work*)
- Flexibility/balance (*dancing, Pilates, tai chi, and yoga*)
- Strength training (*lifting weights, martial arts, Pilates, and yoga*)
- *Simple brisk walking routines help in those who cannot engage in high intensity exercises*

A more in-depth review on how APOE affects the aging brain can be found here:

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