Brain Health Mindset:

How to use the science of neuroprotective foods in your kitchen and your life

Brain Health Kitchen

Annie Fenn, MD
Soul Food Salon
May 9, 2023

A few things about me

Jackson Hole, WY

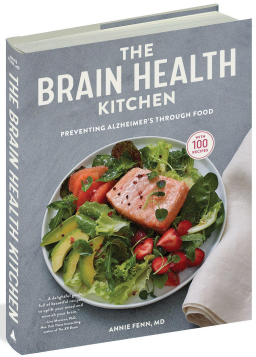
20 years ob/gyn practice

8 years with a focus on menopause

Back to school at age 45: culinary school!

Founded Brain Health Kitchen in 2015

- Cooking school
- Newsletter community
- Book
- Brain Health Retreats



Mission

To help you
take care of your brain
while eating delicious food.

Today

- Brain aging 101
- Brain health mindset
- Brain protective diet update
- Menopause and the brain
- Practical tips to make your cooking more brain healthy
- Homework
- Q and A

Brain Aging 101

Alzheimer's vs dementia

Mild Cognitive Impairment

Beta-amyloid plaques

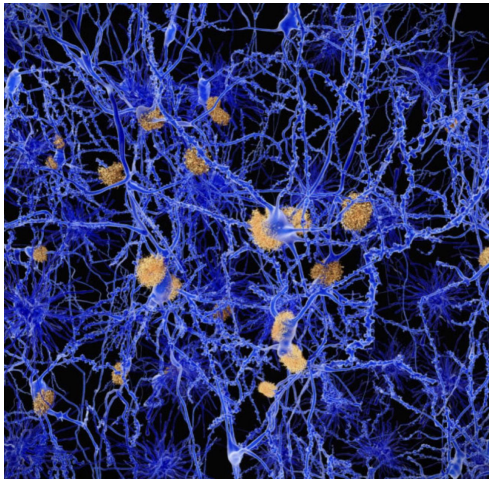
Tau tangles

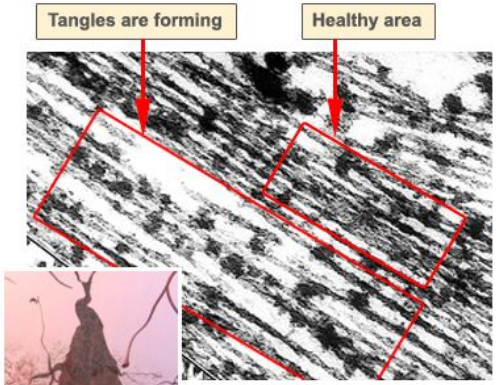
Brain volume

Synaptic dysfunction

Cognitive decline

Chronic inflammation





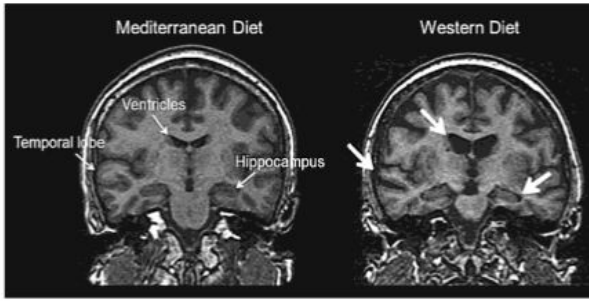
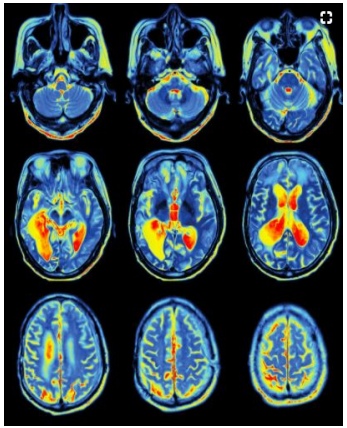
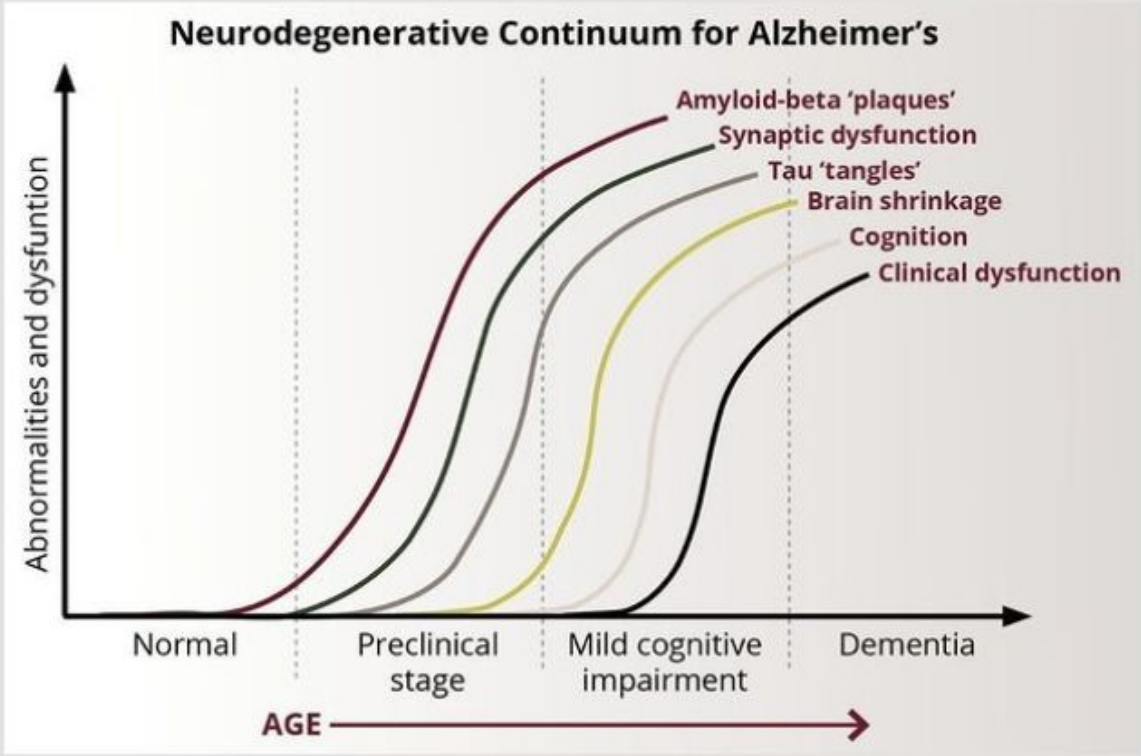


Figure 1. Comparing brains on different diets: Mediterranean diet vs. Western die



Alzheimer's disease starts at least 20 years before the first symptoms.

Biomarkers for Alzheimer's over time



Source: NeuroReserve.com

Brainspan = Lifespan

Brain Health Mindset

A way to approach aging with proactive steps to nourish and protect the brain.

Brain Health Mindset

1. Start with a purpose

Brain Health Mindset

1. Start with a purpose
2. Embrace a clean slate

Brain Health Mindset

1. Start with a purpose
2. Embrace a clean slate
3. Be a Brain Health Ambassador

Brain Health Mindset

1. Start with a purpose
2. Embrace a clean slate
3. Be a Brain Health Ambassador
4. Control your environment

Brain Health Mindset

1. Start with a purpose
2. Embrace a clean slate
3. Be a Brain Health Ambassador
4. Control your environment
5. Progress over perfection

Brain Health Mindset

1. Start with a purpose
2. Embrace a clean slate
3. Be a Brain Health Ambassador
4. Control your environment
5. Progress over perfection
6. Track weekly, not daily

Brain Health Mindset

7. Celebrate positive changes

Brain Health Mindset

7. Celebrate positive changes

8. Ask yourself this one question

Brain Health Mindset

7. Celebrate positive changes

8. Ask yourself this one question

9. Grocery shop with a brain health mindset

Brain-Protective Diets

1. Mediterranean
2. MIND
3. Vegetarian
4. Vegan (Whole Food Plant Based)
5. Green MED
6. Flavonol-rich foods

Following the Mediterranean dietary pattern:

- Reduces brain shrinkage with age
- Reduces the risk of heart attack and stroke by 30%
- Reduces amyloid plaque and tau tangles in the brain

Mediterranean Diet: Brain Volume

Medi Diet followers have 2x more brain volume than those following a Western diet.

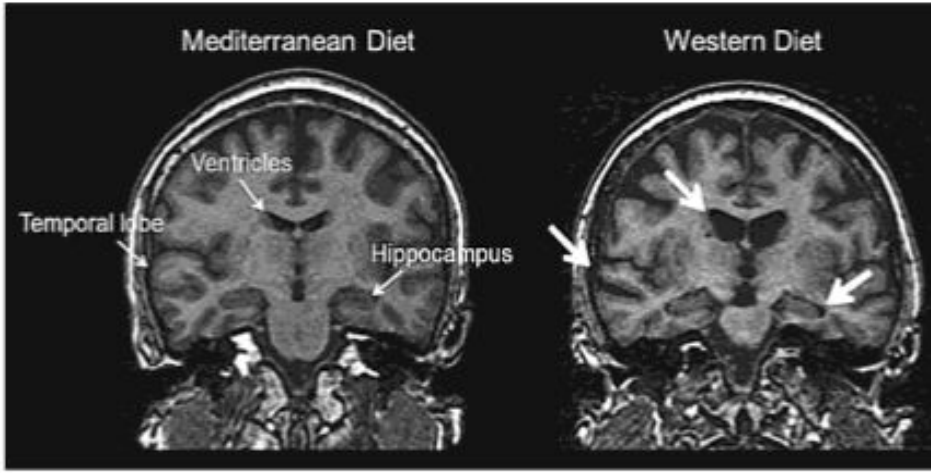


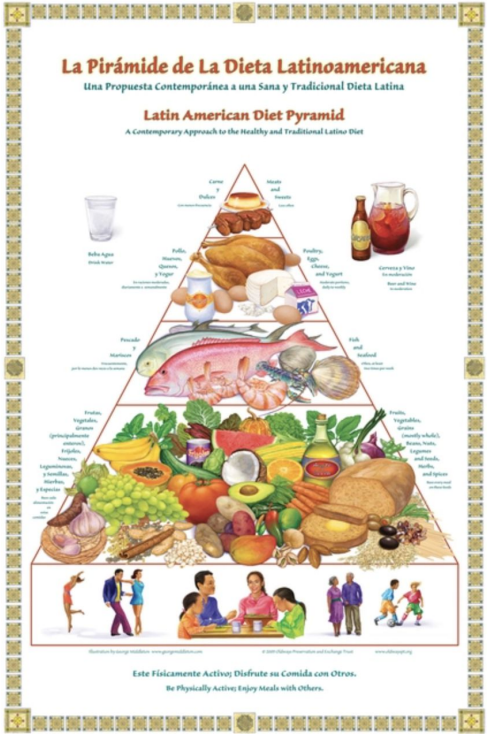
Figure 1. Comparing brains on different diets: Mediterranean diet vs. Western die

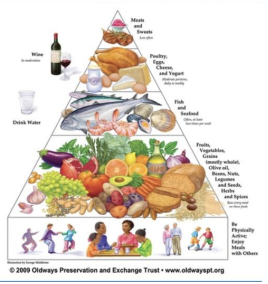
*Mosconi et al, Weill Cornell 468 brains

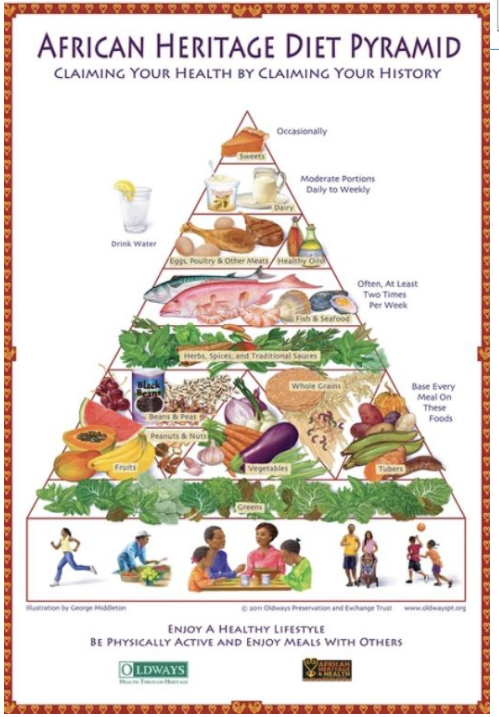
**Luciano et al, Neurology 2017 562 brains

*Scottish study: improved volume in 3 years in those in their 70's

Other traditional dietary patterns







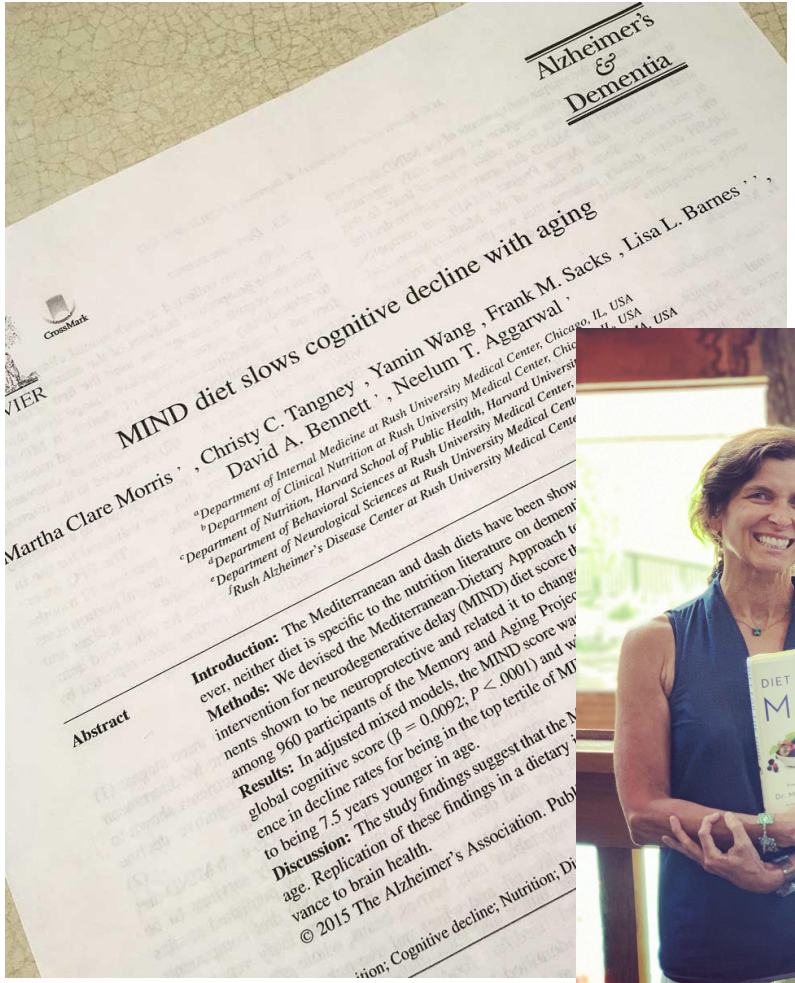
MIND Diet:

10 Brain Healthy food groups

5 food groups

to limit or avoid

*Morris et al, Alz and D, 2015



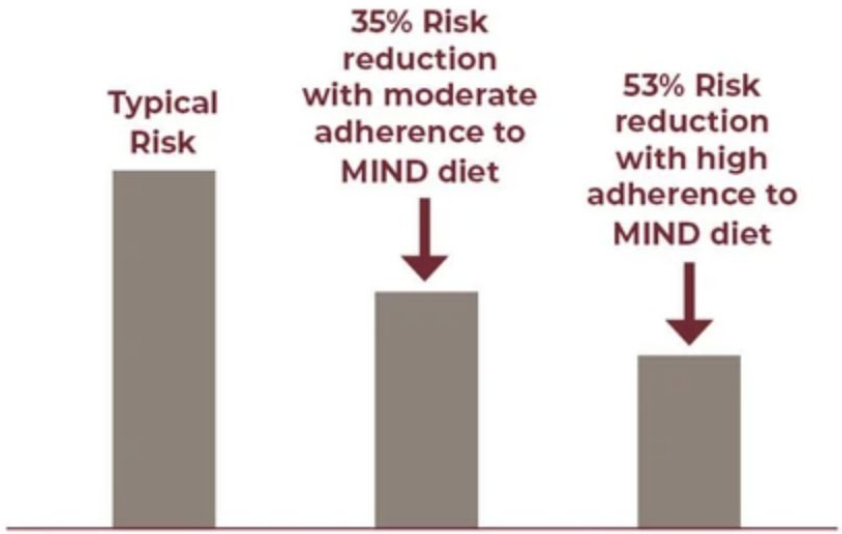
MIND diet 10 brain-healthy food groups

1. **Berries:** 2 or more half-cup servings each week
2. **Leafy Greens:** 6 or more servings (1 cup raw or half-cup cooked) each week
3. **Other Vegetables:** 1 or more (1 cup) servings each day
4. **Nuts:** 5 servings (¼ cup) each week
5. **Beans:** 3 or more ½-cup servings each week
6. Whole Grains: 3 or more ½-cup servings each day
7. **Fish (not fried):** 1 or more servings each week
8. **Poultry (not fried):** 2 or more servings each week
9. **Olive Oil:** use as your primary cooking oil
10. **Red Wine:** up to 5 ounces a day

5 Food Groups to Limit or Avoid

1. **Fried and Fast Food:** Fewer than 1 servings each week
2. **Red Meat:** Fewer than 4 servings each week (3-ounce portion)
3. **Butter and Stick Margarine:** Fewer than 1 tablespoon each day
4. **Cheese:** Fewer than two servings each week (2-ounces)
5. **Pastries and Sweets:** Fewer than 5 servings each week

MIND Diet Study Results



Source: NeuroReserve.com

MIND Diet Study:

- Has been replicated in other countries
- Reduces the risk of Parkinson's disease (by 7.4 years in men, 17.4 years in women)
- Reduces the risk of breast cancer (50%)
- Reduces the risk of open angle glaucoma (up to 80%)
- Reduces the risk of dying from any cause by 37%
- MIND Diet Trial--results this summer

The Green Med Diet is:

The standard Mediterranean diet PLUS daily:

- 3 to 4 cups of green tea
- ¼ cups walnuts
- a green shake made with Mankei (a protein rich leafy green)
- Less meat (especially processed meat) than the standard Medi diet

Kaplan et al, Am J Clin Nutr, Jan 2022

PMID: 35021194

Brain Health Kitchen

Conclusion:

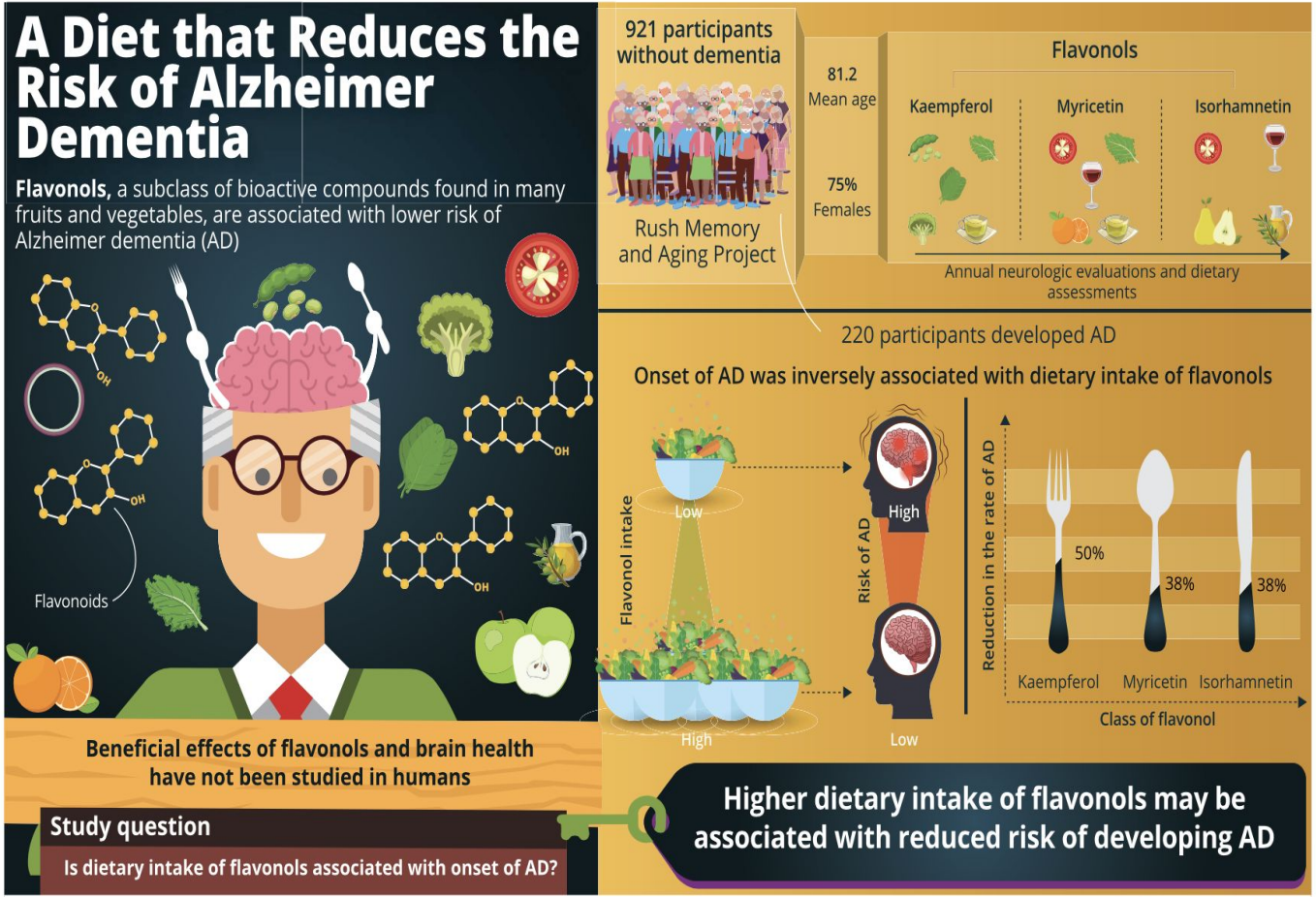
Regular exercise + a Mediterranean diet enriched with specific polyphenol-rich foods and decreased red and processed meat may slow age-related neurodegeneration in those >50.

Kaplan et al, Am J Clin Nutr, Jan 2022

PMID: 35021194

Brain Health Kitchen

Flavonols reduce Alzheimer's risk



doi:10.1212/WNL.0000000000008981

Neurology®

*Holland et al, Flavonols in Food and the Risk of Alzheimer's Dementia, Neurology April 2020

Flavonols improve memory

RESEARCH ARTICLE

Association of Dietary Intake of Flavonols With Changes in Global Cognition and Several Cognitive Abilities

Thomas Monroe Holland, MD, MS, Puja Agarwal, PhD, Yamin Wang, PhD, Klodian Dhana, MD, PhD, Sue E. Leurgans, PhD, Kyla Shea, PhD, Sarah L. Booth, PhD, Kumar B. Rajan, PhD, Julie A. Schneider, MD, MS, and Lisa L. Barnes, PhD

Correspondence
Dr. Holland
thomas_holland@rush.edu

Neurology® 2023;100:e694-e702. doi:10.1212/WNL.0000000000201541

Abstract

Background and Objectives

Previous research has examined the association between cognition and flavonoids: bioactives found in foods, known to possess anti-inflammatory and antioxidant properties. We extend this research by investigating associations of dietary intakes of total flavonols and constituents (kaempferol, quercetin, myricetin, and isorhamnetin) on the change in cognitive performance in global cognition, episodic memory, semantic memory, visuospatial ability, perceptual speed, and working memory.

Methods

The study was conducted using 961 participants (aged 60–100 years) of the Rush Memory and Aging Project, a prospective cohort of community-dwelling Chicagoans who were followed for an average of 6.9 years. Diet was assessed using a validated semiquantitative food frequency questionnaire. Cognitive performance was assessed annually with a battery of 19 standardized tests. Flavonol intake was analyzed as a continuous variable using linear mixed-effects models. Cognitive domain scores were regressed on baseline calorie-adjusted flavonol variables.

Results

Higher dietary intakes of total flavonols and flavonol constituents were associated with a slower rate of decline in global cognition and multiple cognitive domains. In continuous models adjusted for age, sex, education, *APOE* ε4, late-life cognitive activity, physical activity, and smoking, total flavonol intake was associated with slower decline in global cognition β estimate = 0.004 (95% CI 0.001–0.006), episodic memory β = 0.004 (95% CI 0.002–0.006), semantic memory β = 0.003 (95% CI 0.001–0.007), perceptual speed β = 0.003 (95% CI 0.001–0.004), and working memory β = 0.003 (95% CI 0.001–0.005) and marginally associated with visuospatial ability β = 0.001 (95% CI −0.001 to 0.003). Analyses of individual flavonol constituents demonstrated that intakes

Flavonoids

Quercetin
- Red onions
- Capers
- Okra
- Organic tomatoes
- Shallots
- Red apples
- Berries
- Cherries

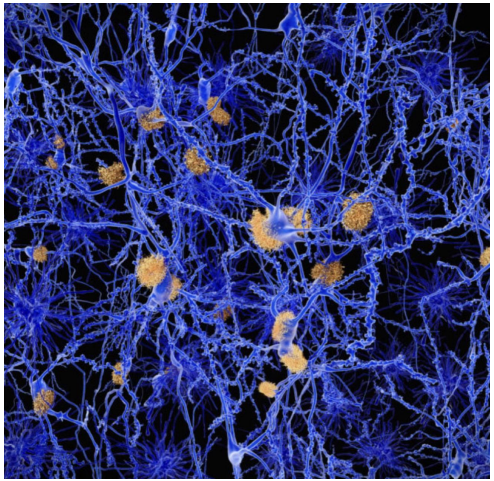
Kaempferol
- Leafy greens
- Soy foods
- Cruciferous vegetables
- Apples
- Grapes
- Green tea

Myricetin
- Citrus
- Berries
- Vegetables
- Herbs

Isorhamnetin
- Pears
- Olive oil
- Peppers
- Cabbage

Willett et al, Long-term Dietary Flavonoid Intake and Subjective Cognitive Decline in US Men and Women, Neurology July 2021

Mediterranean and MIND diets reduce amyloid and tau in the brain



Neurology®

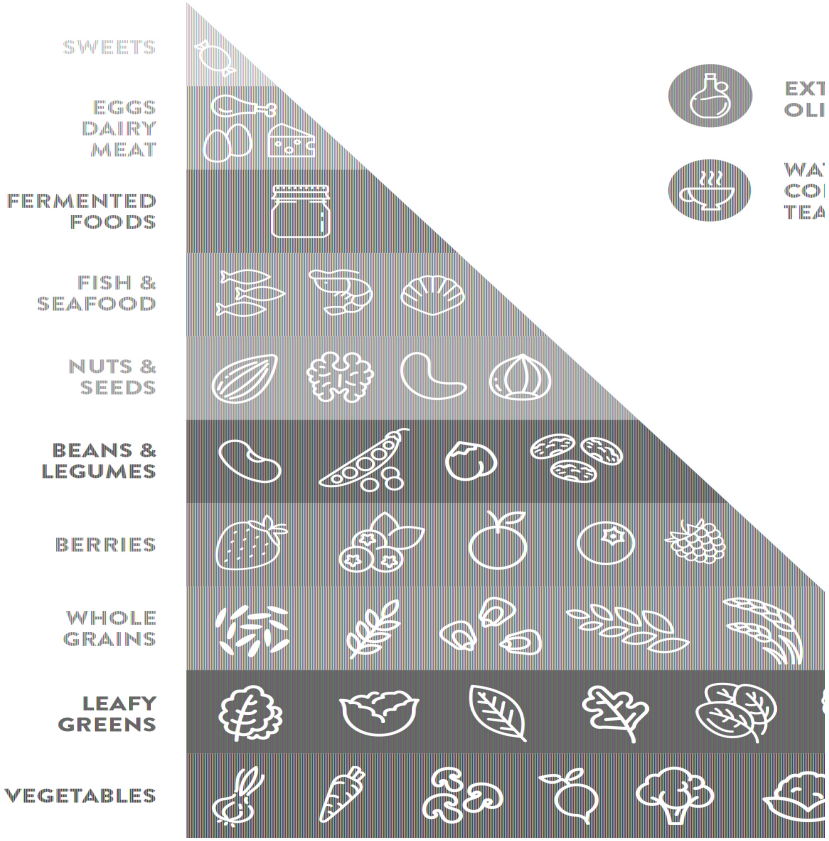
March 08, 2023 RESEARCH ARTICLE

Association of Mediterranean-DASH Intervention for Neurodegenerative Delay and Mediterranean Diets With Alzheimer Disease Pathology

Puja Agarwal, Sue E. Leurgans, Sonal Agrawal, Neelum Aggarwal, laurel J Cherian, Bryan D James, Klodian Dhana, Lisa L. Barnes, David A. Bennett, Julie A. Schneider

The Brain Health Kitchen Pyramid

A week of brain healthy eating looks like this.



Moderate drinking of alcohol increases Alzheimer's risk

1 drink per day for women
2 drinks per day for men

nature COMMUNICATIONS

ARTICLE

https://doi.org/10.1038/s41467-022-28735-5 OPEN

Associations between alcohol consumption and gray and white matter volumes in the UK Biobank

Remi Daviet[1✉], Gökhan Aydogan[2], Kanchana Jagannathan[3], Nathaniel Spilka[3], Philipp D. Koellinger[4,5], Henry R. Kranzler[3,6], Gideon Nave[7✉] & Reagan R. Wetherill[3✉]

Heavy alcohol consumption has been associated with brain atrophy, neuronal loss, and poorer white matter fiber integrity. However, there is conflicting evidence on whether light-to-moderate alcohol consumption shows similar negative associations with brain structure. To address this, we examine the associations between alcohol intake and brain structure using multimodal imaging data from 36,678 generally healthy middle-aged and older adults from the UK Biobank, controlling for numerous potential confounds. Consistent with prior literature, we find negative associations between alcohol intake and brain macrostructure and microstructure. Specifically, alcohol intake is negatively associated with global brain volume measures, regional gray matter volumes, and white matter microstructure. Here, we show that the negative associations between alcohol intake and brain macrostructure and micro-structure are already apparent in individuals consuming an average of only one to two daily alcohol units, and become stronger as alcohol intake increases.

www.nature.com/scientificreports

SCIENTIFIC REPORTS

nature research

Moderate alcohol use is associated with decreased brain volume in early middle age in both sexes

Satu Immonen[1], Jyrki Launes[1], Ilkka Järvinen[1], Maarit Virta[1], Ritva Vanninen[2,3], Nella Schiavone[1], Eliisa Lehto[1], Annamari Tuulio-Henriksson[1], Jari Lipsanen[1], Katarina Michelsson[4] & Laura Hokkanen[1✉]

The aim was to examine cross-sectional association between moderate alcohol consumption and total brain volume in a cohort of participants in early middle-age, unconfounded by age-related neuronal change. 353 participants aged 39 to 45 years reported on their alcohol consumption using the AUDIT-C measure. Participants with alcohol abuse were excluded. Brain MRI was analyzed using a fully automated method. Brain volumes were adjusted by intracranial volume expressed as adjusted total brain volume (aTBV). AUDIT-C mean of 3.92 (*SD* 2.04) indicated moderate consumption. In a linear regression model, alcohol consumption was associated with smaller aTBV ($B = -0.258$, $p < .001$). When sex and current smoking status were added to the model, the association remained significant. Stratified by sex, the association was seen in both males ($B = -0.258$, $p = 0.003$) and females ($B = -0.214$, $p = 0.011$). Adjusted for current smoking, the association remained in males ($B = -0.268$, $p = 0.003$), but not in females. When alcohol consumption increased, total brain volume decreased by 0.2% per one AUDIT-C unit already at 39–45 years of age. Moderate alcohol use is associated with

Alcohol and Dementia

Don’t drink? Don’t start.

If you drink: Be a Light Drinker, not a Moderate one

0-4 drinks per week

1 drink = 5 oz. glass of wine

2021: Topiwala et al, BMJ. No safe level of alcohol consumption for brain health, observational cohort study of 25,378 UK Biobank participants.

Women's brain health

2/3 people living with Alzheimer's are female

Lifetime risk at 65

- Women: 1 in 6
- Men: 1 in 11

Some possible reasons why:

- Women live longer than men.
- Women have less education than men.
- Loss of estrogen at menopause makes the brain vulnerable.
- Women get less sleep.
- Diagnosis is delayed.
- Alcohol may be more neurotoxic to women.
- The ApoE4 gene variant is expressed differently in women.

HRT and brain volume

Saleh *et al. Alzheimer's Research & Therapy* (2023) 15:10
https://doi.org/10.1186/s13195-022-01121-5

Alzheimer's
Research & Therapy

RESEARCH Open Access

Hormone replacement therapy is associated with improved cognition and larger brain volumes in at-risk *APOE4* women: results from the European Prevention of Alzheimer's Disease (EPAD) cohort

Rasha N. M. Saleh[1*], Michael Hornberger[1], Craig W. Ritchie[2] and Anne Marie Minihane[1]

Abstract

Background The risk of dementia is higher in women than men. The metabolic consequences of estrogen decline during menopause accelerate neuropathology in women. The use of hormone replacement therapy (HRT) in the prevention of cognitive decline has shown conflicting results. Here we investigate the modulating role of *APOE* genotype and age at HRT initiation on the heterogeneity in cognitive response to HRT.

Methods The analysis used baseline data from participants in the European Prevention of Alzheimer's Dementia (EPAD) cohort (total *n*= 1906, women= 1178, 61.8%). Analysis of covariate (ANCOVA) models were employed to test the independent and interactive impact of *APOE* genotype and HRT on select cognitive tests, such as MMSE, RBANS, dot counting, Four Mountain Test (FMT), and the supermarket trolley test (SMT), together with volumes of the medial temporal lobe (MTL) regions by MRI. Multiple linear regression models were used to examine the impact of age of HRT initiation according to *APOE4* carrier status on these cognitive and MRI outcomes.

HRT and tau deposition

Original Investigation

ON

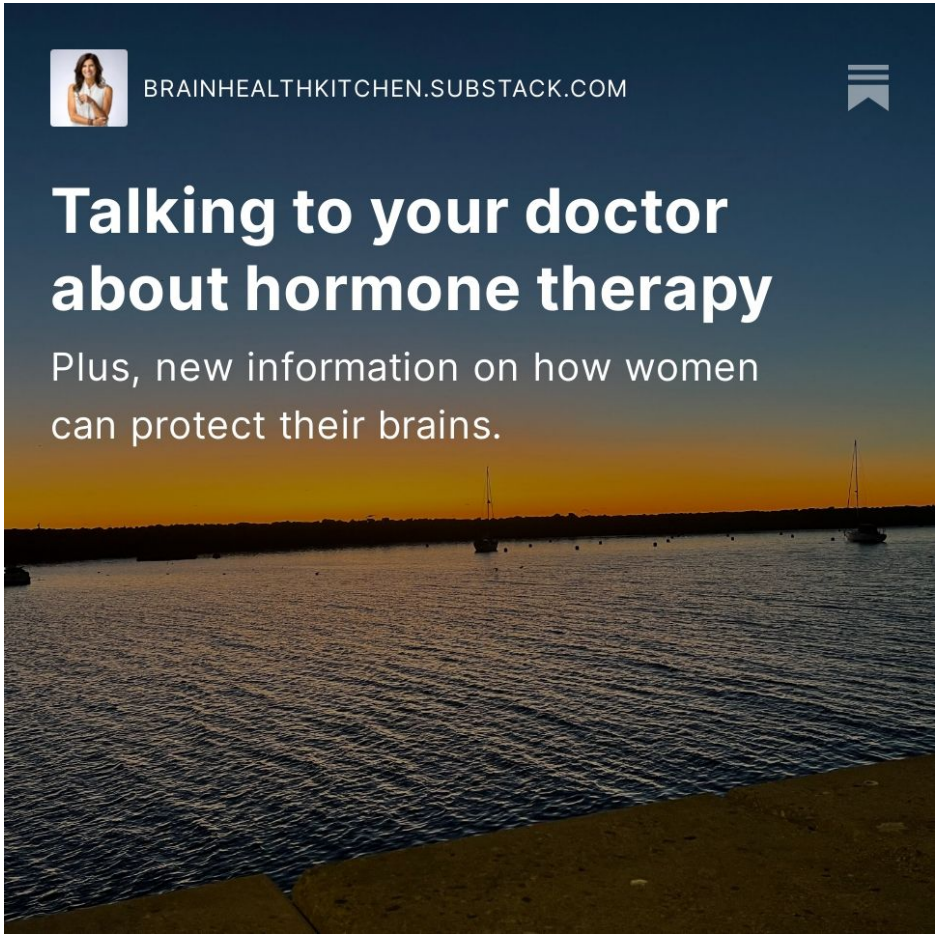
April 3, 2023

Association of Age at Menopause and Hormone Therapy Use With Tau and β-Amyloid Positron Emission Tomography

Gillian T. Coughlan, MS, PhD[1]; Tobey J. Betthauser, PhD[2,3]; Rory Boyle, PhD[1]; et al

» Author Affiliations

JAMA Neurol. Published online April 3, 2023. doi:10.1001/jamaneurol.2023.0455


BRAINHEALTHKITCHEN.SUBSTACK.COM
Talking to your doctor about hormone therapy
Plus, new information on how women can protect their brains.

Tips and Tricks

Dairy milk ----> Plant-based milk
Cashew cream----> Cream, creamers, coconut milk
Cheese ---> Nut-based cheeses
Coffee ----> Go dairy free, unsweetened
Extra Virgin Olive Oil----> Butter
Whole grain flour----> All purpose white
Dates, fruit purees, honey, maple syrup----> Refined sugar
Meat and Chicken ---> Highest-quality, grass-fed, sustainable and ethical source, small serving
*¾ of your plate should be plants

Recap

1. Lifestyle factors may help you fend off Alzheimer's.
2. Avoid sugary and artificially sweetened drinks.
3. Enjoy your coffee (and tea), black if possible.
4. The Mediterranean and MIND diets are brain protective.
5. Flavonoids are crucial brain health nutrients.

Recap

6. Use extra-virgin olive oil as your primary cooking oil.

7. Amyloid protein is cleared from the brain when you sleep.

8. Drink lightly, if at all.

9. Eat berries, vegetables, nuts/seeds, and leafy greens every day.

10. Eating for brain health is not a diet. It's a lifestyle to embrace the lifelong care of your brain. Progress over perfection.

Resources

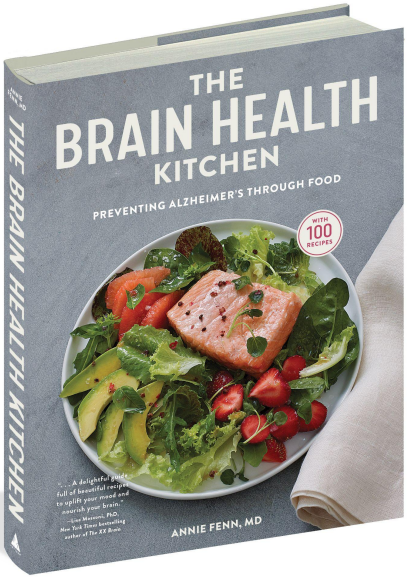
100 free recipes: BrainHealthKitchen.com

Newsletter: BrainHealthKitchen.Substack.com

Book: The Brain Health Kitchen

Email: brainhealthkitchen@gmail.com

Brain Health Retreats: Italy, Panama



Wellness Wednesdays

Brain Health Homework

Tell me one thing you will do to make your diet more brain healthy.

Email: brainhealthkitchen@gmail.com

References

1. Morris, Martha Clare et al. “MIND diet slows cognitive decline with aging.” *Alzheimer's & dementia : the journal of the Alzheimer's Association* vol. 11,9 (2015): 1015-22. doi:10.1016/j.jalz.2015.04.011
2. Metcalfe-Roach, Avril et al. “MIND and Mediterranean Diets Associated with Later Onset of Parkinson's Disease.” *Movement disorders : official journal of the Movement Disorder Society* vol. 36,4 (2021): 977-984. doi:10.1002/mds.28464
3. Aghamohammadi, Vajiheh et al. “Adherence to the MIND Diet and Risk of Breast Cancer: A Case-control Study.” *Clinical breast cancer* vol. 21,3 (2021): e158-e164. doi:10.1016/j.clbc.2020.09.009
4. Vergroesen, J.E., de Crom, T.O.E., van Duijn, C.M. *et al.* MIND diet lowers risk of open-angle glaucoma: the Rotterdam Study. *Eur J Nutr* (2022). https://doi.org/10.1007/s00394-022-03003-w
5. Corley, Janie. “Adherence to the MIND diet is associated with 12-year all-cause mortality in older adults.” *Public health nutrition* vol. 25,2 (2022): 358-367. doi:10.1017/S1368980020002979