Social Connection, food and nutrition

Professor Vicki Flood

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UNIVERSITY CENTRE FOR RURAL HEALTH NORTHERN RIVERS

THE UNIVERSITY OF SYDNEY

I acknowledge the Nyangbul people of the Bundjalung nation.

I acknowledge and respect their continuing culture and contribution to the life of this region.

Outline

- Social connection, older people – a story
- The evidence of food and nutrition and social connection
- Why food and nutrition matters – importance in healthy aging

A story

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Older people, Northern Rivers

- In Northern Rivers NSW, ~27% of people aged >65 years (cf. to 17% in Australia)[1.]
- 35% of people living in rural communities experience loneliness (cf to 30% in metro areas) [2]
- 50% of older adults are socially isolated (50 years+)[3]
- My mum, aged 93 years, lives in Northern NSW residential aged care facility.

1. ABS 2021; 2. State of the Nation Report: Social Connection in Australia 2021; 3. Voices of Solitude: Loneliness and Social Isoaltion Among Older Adults in NSW (COTA)

Scoping Review, 2023

Appetite 191 (2023) 107051

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

The association between loneliness or social isolation and food and eating behaviours: A scoping review

Katherine Hanna [a,*], Jenna Cross [a], Amy Nicholls [a], Danielle Gallegos [a,b]

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- 26 quantitative studies;
- Most reported association between loneliness/ social isolation and poor eating behaviours
- In particular:
  - Low fruit and vegetable intake
  - Lower diet quality

Delerue Matos *et al. BMC Public Health* (2021) 21:924
https://doi.org/10.1186/s12889-021-10956-w

BMC Public Health

RESEARCH Open Access

Social isolation, physical inactivity and inadequate diet among European middle-aged and older adults

Check for updates

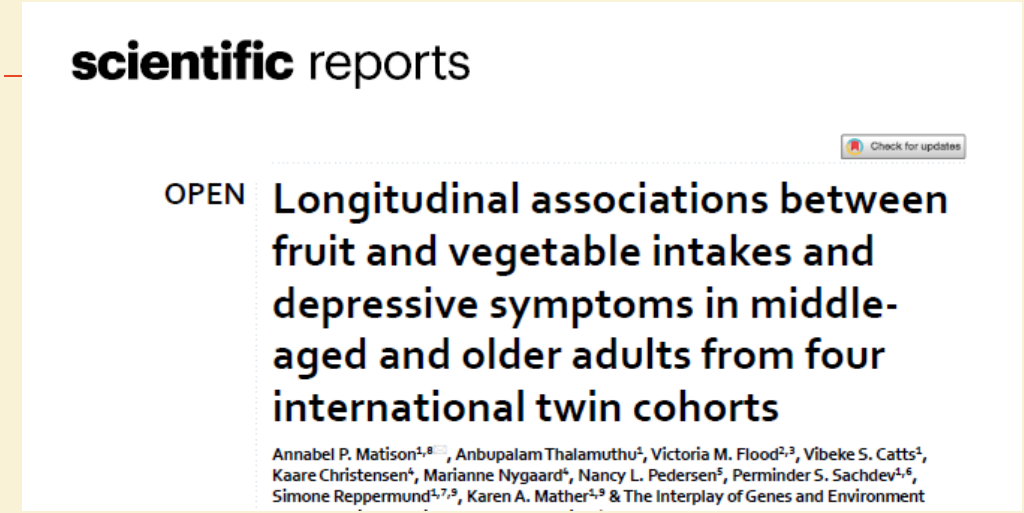
Alice Delerue Matos[1,2*], Fátima Barbosa[2], Cláudia Cunha[2], Gina Voss[2] and Filipa Correia[2]

- Survey of Health, Aging and Retirement in Europe
- 17 European countries. 67,173 people, aged 50+ years
- People with high level of social isolation (~17%) (cf. to low/ intermediate)
  - Physical inactivity, (30% vs 17%)
  - Consumed less fruit or vegetables each day (28% vs 22%)
  - Had higher rates of depression (43% vs 27%)

Table 2 Multivariate logistic regression for high social isolation, by country

Health risk behaviours	Physical inactivity			No fruits or vegetables		
Country	OR	CI 95%	p	OR	CI 95%	p
Austria	2.09	(1.63–2.69)	**< 0.001**	1.65	(1.35–2.03)	**< 0.001**
Germany	1.40	(1.07–1.83)	**0.013**	1.53	(1.24–1.88)	**< 0.001**
Sweden	1.53	(1.12–2.10)	**0.008**	1.69	(1.33–2.15)	**< 0.001**
Spain	0.86	(0.71–1.04)	0.123	1.13	(0.95–1.35)	0.170
Italy	1.12	(0.95–1.32)	0.178	1.40	(1.15–1.70)	**< 0.001**
France	1.19	(0.96–1.48)	0.115	1.82	(1.43–2.32)	**< 0.001**
Denmark	1.59	(1.13–2.23)	**0.008**	1.88	(1.44–2.44)	**< 0.001**
Greece	1.41	(1.18–1.70)	**< 0.001**	1.17	(1.00–1.37)	**0.051**
Switzerland	1.06	(0.73–1.53)	0.758	1.71	(1.26–2.34)	**< 0.001**
Belgium	1.28	(1.05–1.56)	**0.013**	2.37	(1.94–2.90)	**< 0.001**
Israel	0.97	(0.71–1.32)	0.844	1.19	(0.90–1.58)	0.222
Czech Republic	0.99	(0.82–1.21)	0.944	1.31	(1.12–1.53)	**< 0.001**
Poland	1.31	(0.99–1.75)	0.063	1.13	(0.90–1.42)	0.303
Luxembourg	1.76	(1.14–2.71)	**0.010**	1.77	(1.18–2.65)	**0.006**
Portugal	1.09	(0.78–1.54)	0.607	1.25	(0.81–1.94)	0.317
Slovenia	0.95	(0.72–1.24)	0.693	1.46	(1.15–1.84)	**0.002**
Estonia	1.27	(1.06–1.51)	**0.009**	1.48	(1.29–1.71)	**< 0.001**
Croatia	1.26	(0.93–1.71)	0.140	1.56	(1.22–1.99)	**< 0.001**

Source: SHARE, wave 6, release 7.0.0., $N = 66{,}963$. Model 1: adjusted for age, sex, education, income, physical and mental health, excessive alcohol consumption, ever smoked, number of doctor's appointments in the last month and non-consumption of fruit or vegetables every day. Model 2: adjusted to variables of Model 1, except non-consumption of fruit or vegetables every day, and plus physical inactivity



scientific reports

Check for updates

OPEN

Longitudinal associations between fruit and vegetable intakes and depressive symptoms in middle-aged and older adults from four international twin cohorts

Annabel P. Matison[1,8], Anbupalam Thalamuthu[1], Victoria M. Flood[2,3], Vibeke S. Catts[1], Kaare Christensen[4], Marianne Nygaard[4], Nancy L. Pedersen[5], Perminder S. Sachdev[1,6], Simone Reppermund[1,7,9], Karen A. Mather[1,9] & The Interplay of Genes and Environment

- Longitudinal study of twins: Australia, Denmark, Sweden, USA (n=3483)
- Depressive symptoms and fruit and vegetable intake
- Higher fruit and vegetable intake, associated with lower depressive symptoms

healthcare

MDPI

Article

Risk of Social Isolation as a Contributing Factor to Diet Quality in Community-Dwelling Older Persons Living in the Australian Capital Territory—A Pilot Study

Elizabeth Low [1,2,3,*], Nathan M. D'Cunha [1,2,3], Ekavi Georgousopoulou [1,3], Nenad Naumovski [1,3,4,5], Rachel Bacon [1], Stephen Isbel [2,6], Megan Brocklehurst [1], Matthew Reynolds [1], Daena Ryan [1] and Jane Kellett [1,2,3]

- N=107 community living older people, 55 + years, from ACT
- Assessed social isolation (Lubben Social Network Scale)
- Food frequency questionnaire, assessed diet quality inflammation (DII)
- Higher social isolation, associated with more inflammatory diet

Social connection, food and nutrition: some local evidence

- Social isolation identified as important contributing factor to frequent and/ or avoidable hospitalisations, among people living alone, not socializing,or being isolated from family.
- A quote from home-based aged care provider on what a patient lost on becoming housebound:
- "*previously …he used to drive his car down to the coffee shop, have a big breakfast and that was his main intake for the day….he lost the network of people, and became depressed…"what's life for if I can't get out and have a coffee and socialize with the folk in the coffee shop…"*

CSIRO PUBLISHING
Australian Health Review, 2013, 37, 223–231
http://dx.doi.org/10.1071/AH12152
Research Note

The role of social isolation in frequent and/or avoidable hospitalisation: rural community-based service providers' perspectives

Jo Longman[1,2] BSc, MPH, PhD, Research Fellow
Megan Passey[1] BMed (Hons), MPH, MSc, Senior Lecturer
Judy Singer[1] DipAppSc (Naturopathy), PhD, Research Officer
Geoff Morgan[1] BSc, PhD, Associate Professor

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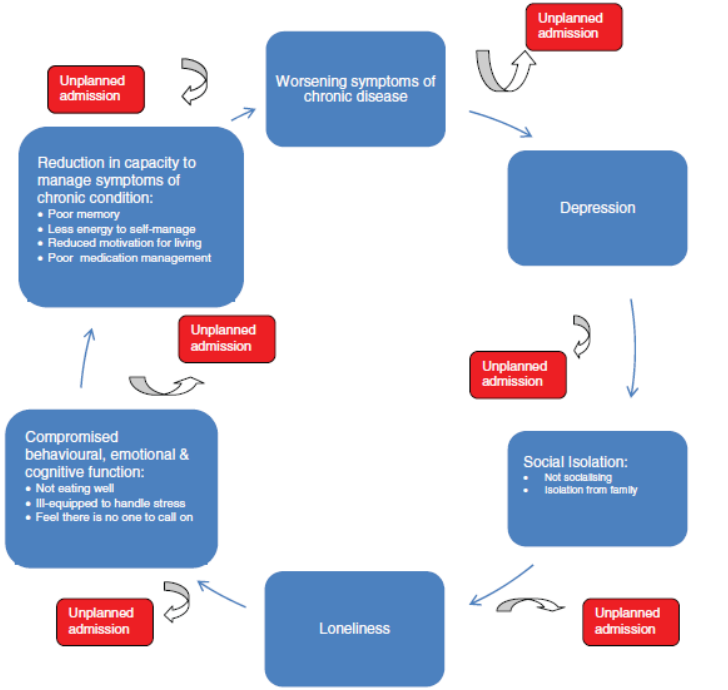

These factors exist within complex and interwoven relationships to one another. However, for clarity this diagram offers a simplified cycle or web

Mediterranean Diet Pyramid (Oldways Diet Pyramid)

xxx

Review Article

Evolution of Mediterra and definitions

Sue Radd-Vagenas Grad Dip Diet[1], A MD[1], Victoria M Flood PhD[1,3,4]

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The ideal mediterranean diet

MYB: BJN, 2022

NHMRC Dietary Guidelines, 2013:
"MedDi one of the healthiest diet patterns in the world due to its relation with low morbidity and mortality."

PREDIMED Trial

- Multi-centre, randomised primary prevention trial in Spain
- Assessed the long-term effects of Mediterranean Diet on CVD
- 7447 men and women at high risk of CVD:
  Type 2 Diabetes
  or 3 of the following
  smoking, hypertension, elevated LDL cholesterol, low HDL, overweight or obese, family history of CHD

- 3 Diets:
  1. MedDi + EVOO (50mL/ day)
  2. MedDi + nuts (30g/ day: walnuts, almonds, hazlenuts)
  3. Lower fat diet

- No energy (calorie) restriction and no physical activity intervention

Mediterranean Diet, and CVD, RCT from PREDIMED trial

The NEW ENGLAND JOURNAL of MEDICINE

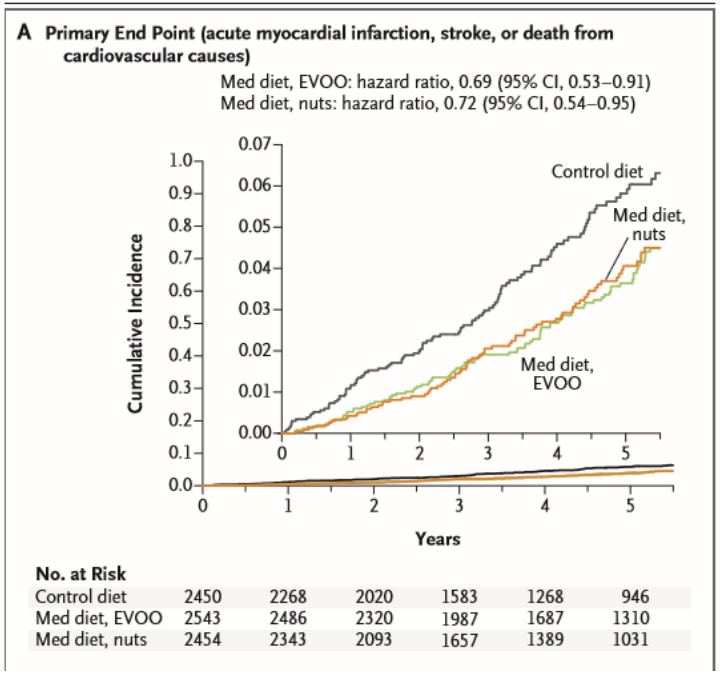
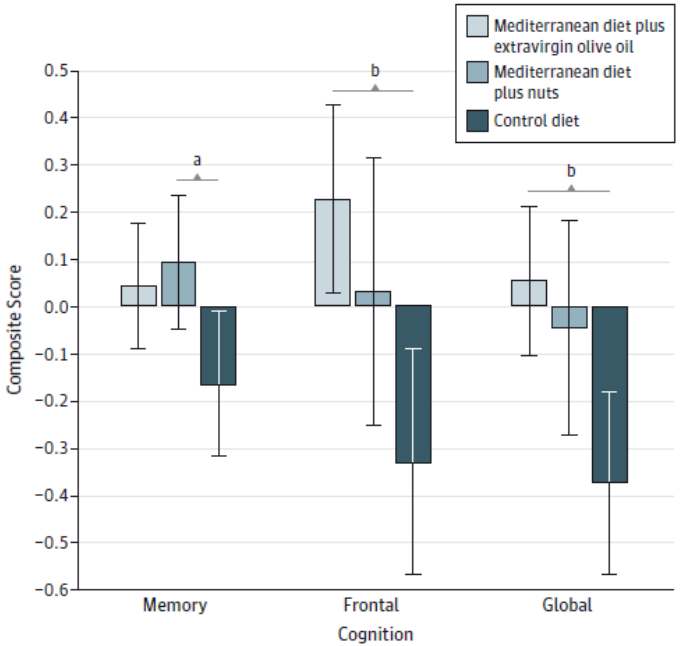


Figure 1. Kaplan–Meier Estimates of the Cumulative Incidence of End-Point Events in the Total Study Population.

Panel A shows the incidence of the primary end point (a composite of acute myocardial infarction, stroke, and death from cardiovascular causes), and Panel B shows total mortality. The insets show the same data on an expanded y axis. Hazard ratios were stratified according to sex, recruiting site, and educational level (five categories) and adjusted for age (continuous variable), smoking (never smoked, former smoker, or current smoker), hypertension (yes or no), dyslipidemia (yes or no), diabetes (yes or no), family history of premature coronary heart disease, body-mass index (continuous variable), waist-to-height ratio (continuous variable), physical activity (in quintiles), and propensity scores that estimated the probability of assignment to each intervention group on the basis of 30 baseline variables (see pages 12 through 17 in the Supplementary Appendix). Robust standard errors to account for intracluster correlations were used. CI denotes confidence interval, EVOO extra-virgin olive oil, and Med Mediterranean.

Estruch, Ros et al NEJM, 2018

Figure 2. Changes in Cognitive Function Measured With Composites by Intervention Group



a. $p < 0.05$
b. $p < 0.01$

Research

Original Investigation

Mediterranean Diet and Age-Related Cognitive Decline
A Randomized Clinical Trial

Cinta Valls-Pedret, MSc; Alex Sala-Vila, DPharm, PhD; Mercè Serra-Mir, RD; Dolores Corella, DPharm, PhD; Rafael de la Torre, DPharm, PhD; Miguel Ángel Martínez-González, MD, PhD; Elena H. Martínez-Lapiscina, MD, PhD; Montserrat Fitó, MD, PhD; Ana Pérez-Heras, RD; Jordi Salas-Salvadó, MD, PhD; Ramon Estruch, MD, PhD; Emilio Ros, MD, PhD

Spin-off from Predimed Trail:
RCT: 3 groups, ~150 per group,
~100-130 per group after 4 years of follow-up.
Cognitive tests and baseline and follow-up.
Intervention:

1. MedDiet + olive oil
2. MedDiet + nuts
3. Control group, lower fat diet

nature medicine

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Article | Published: 28 January 2025

An online multidomain lifestyle intervention to prevent cognitive decline in at-risk older adults: a randomized controlled trial

Henry Brodaty, Tiffany Chau, Megan Heffernan, Jeewani A. Ginige, Gavin Andrews, Michael Millard, Perminder S. Sachdev, Kaarin J. Anstey, Nicola T. Lautenschlager, John J. McNeil, Louisa Jorm, Nicole A. Kochan, Anthony Maeder, Heidi Welberry, Juan Carlo San Jose, Nancy E. Briggs, Gordana Popovic, Yorgi Mavros, Carolina Almendrales Rangel, Yian Noble, Sue Radd-Vagenas, Victoria M. Flood, Fiona O'Leary, Amit Lampit, Courtney C. Walton, Polly Barr, Maria Fiatarone Singh & Michael Valenzuela — Show fewer authors

Nature Medicine **31**, 565–573 (2025) | Cite this article

8494 Accesses | **17** Citations | **252** Altmetric | Metrics

The ideal mediterranean diet

- RCT, 55 – 77 years (n=6104)
- Mean change in global composite score
- (Sig between group difference)
- Medicul score improvement, increased mean of 8.7 (index out of 100).

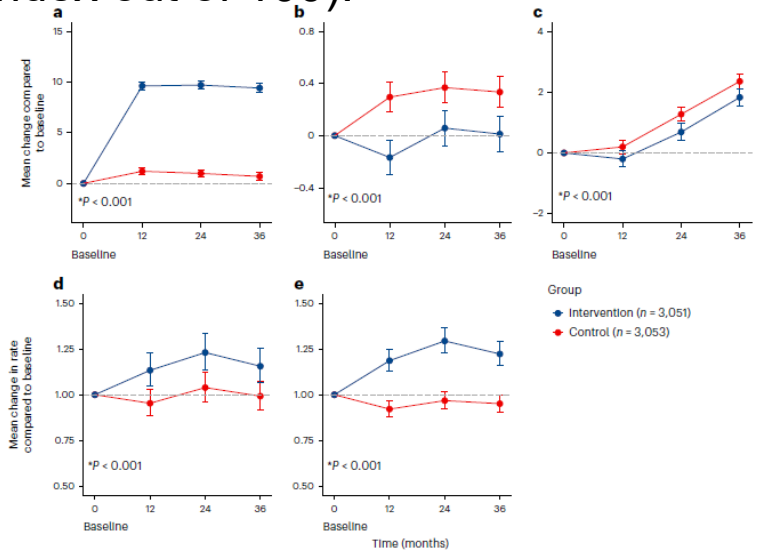

Fig. 4 | Mean change and relative rate of change in other health-related outcomes from baseline to 3 years by group (n = 6,104). Figure shows the estimated mean change and relative rate of change in other health-related

a, MediCul. **b**, K10. **c**, ANU-ADRI-SF. **d**, Strength training. **e**, Aerobic training. Error bars show 95% CI. *P value is for the two-tailed likelihood ratio chi-square test of the difference in change between groups, baseline to 3 years.

Food components	Score value
Olive oil primary fat source	6 points
Vegetables, ≥5/d	2 points
Dark green leafy veggie's ≥4/wk	2 points
Nuts, ≥5/ wk	6 points

British Journal of Nutrition (2018), 120, 1189–1200
doi:10.1017/S0007114518002428

Reliability and validity of a Mediterranean diet and culinary index (MediCul) tool in an older population with mild cognitive impairment

Sue Radd-Vagenas[1], Maria A. Fiatarone Singh[1,2], Michael Inskip[1], Yorgi Mavros[1], Nicola Gates[3], Guy C. Wilson[1], Nidhi Jain[1], Jacinda Meiklejohn[1], Henry Brodaty[3,4], Wei Wen[3,5], Nalin Singh[1], Bernhard T. Baune[6], Chao Suo[7], Michael K. Baker[1,8], Nasim Foroughi[9], Perminder S. Sachdev[3,4], Michael Valenzuela[10] and Victoria M. Flood[1,11]*

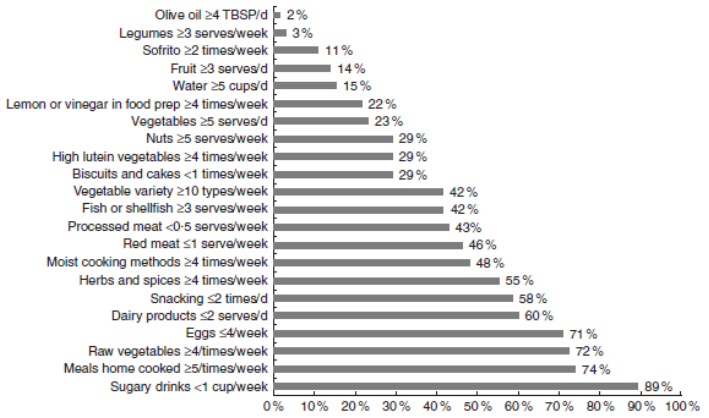

Fig. 2. Percentage of participants who reach Mediterranean diet thresholds according to 3-d food records (*n* 65). TBSP, tablespoon; prep, preparation.

Key nutrition elements of the Mediterranean Diet and protective mechanisms for health

Food component	Key Nutrient/s	Health Impact
Extra virgin olive oil, 3-4 tablespoons	Mono-unsaturated fatty acids (MUFA – oleic acid); Polyphenols 	Improved lipids: ↑ HDL, ↓ LDL Inhibits platelet aggregation Anti-inflammatory, phenolic compounds adds stability to EVOO during cooking
Nuts, 30g per day	MUFA Vit E Lutein (pistachio) Alpha-linolenic acid (walnuts) 	Improved lipids Anti-oxidant Elongate to long chain omega-3 PUFA (also in fish) 
Dark green leafy vegetables, ½ cup per day	Lutein Nitrate 	Preferentially absorbed into eyes/ brain tissue / grey matter Vasodilation; **reduces inflammation**
Legumes, 150g 2-3x/week	Low Glycemic Index High fibre 	Gut health, gut microbiome, soluble fibre, improves cholesterol. Improved insulin response
Fruit	Vit C Polyphenols Fibre	Tissue health, antioxidant, reduces inflammation.
Water/ herbal tea infusions, every day	Fluid  	Hydration. Limit added sugar
Moist cooking methods; home veggie garden	Lower temp cooking (not burning heat); exercise; Vit D	Lower formation of Advanced glycation end-products, **reduces inflammation**

biomedicines

MDPI

Review

Anti-Inflammatory Properties of Diet: Role in Healthy Aging

Kristine Stromsnes [1], Angela G. Correas [1], Jenny Lehmann [2,3], Juan Gambini [1,*] and Gloria Olaso-Gonzalez [1]

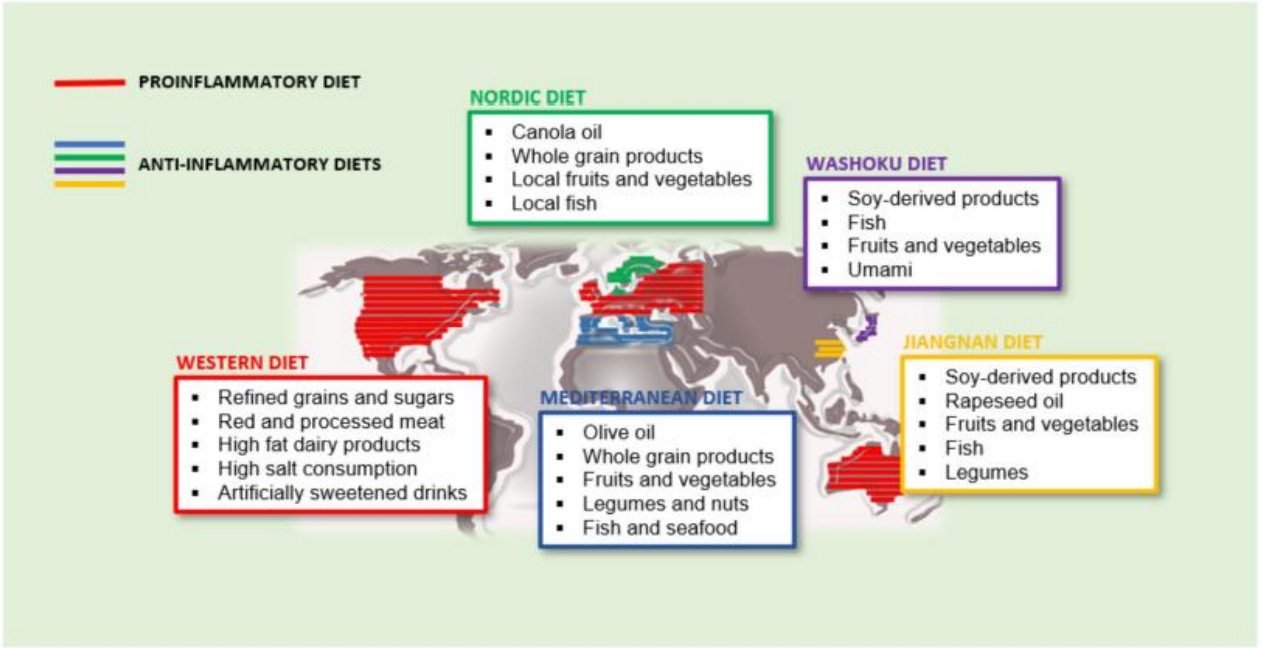

Figure 1. Proinflammatory and anti-inflammatory diets and its main distribution in the world.

RESEARCH ARTICLE

Diet Inflammatory Index and Dementia Incidence

A Population-Based Study

Sokratis Charisis, MD, Eva Ntanasi, PhD, Mary Yannakoulia, PhD, Costas A. Anastasiou, PhD, Mary H. Kosmidis, PhD, Efthimios Dardiotis, MD, PhD, Antonios N. Gargalionis, MD, PhD, Kostas Patas, MD, PhD, Stylianos Chatzipanagiotou, MD, PhD, Ioannis Mourtzinos, PhD, Katerina Tzima, PhD, Georgios Hadjigeorgiou, MD, PhD, Paraskevi Sakka, MD, PhD, Dimitrios Kapogiannis, MD, PhD, and Nikolaos Scarmeas, MD, PhD

Neurology® 2021;97:e2381-e2391. doi:10.1212/WNL.0000000000012973

Table 3 Unadjusted and Adjusted Cox Regression Models

		DII score as a continuous variable		DII score as tertiles			
Model	At risk, n	HR (95% CI)	*p* Value	Tertile	HR (95% CI)	*p* Value	*p* Value for trend
1[a]	1,059	1.18 (1.06–1.32)	0.002	1st	Reference		0.002
				2nd	2.19 (1.09–4.41)	0.028	
				3rd	2.97 (1.50–5.87)	0.002	
2[b]	1,039	1.21 (1.03–1.42)	0.023	1st	Reference		0.014
				2nd	1.92 (0.89–4.11)	0.095	
				3rd	3.01 (1.24–7.26)	0.014	
3[c]	1,025	1.20 (1.02–1.41)	0.031	1st			0.018
				2nd	1.89 (0.88–4.05)	0.101	
				3rd	2.89 (1.20–6.96)	0.018	

Abbreviations: CI = confidence interval; DII = diet inflammatory index; HR = hazard ratio.
Results from the associations between baseline Diet Inflammatory Index scores and the hazard ratio for dementia incidence.
[a] Model 1 is unadjusted.
[b] Model 2 is adjusted for age, sex, years of education, energy intake, and baseline mild cognitive impairment.
[c] Model 3 is adjusted for age, sex, years of education, energy intake, baseline mild cognitive impairment, and clinical comorbidity index score.

Longitudinal Study: HELIAD, n=1059,
Mean age=73 yrs followed for 3 years,
n=62 developed dementia

Highest score for pro-inflammatory diets, 3x risk of dementia

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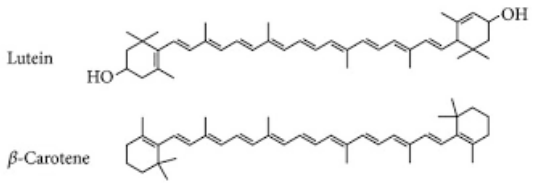
Low inflammatory and antioxidant nutrient: lutein

Nutrition Research and Practice (*Nutr Res Pract*) 2012;6(2):113-119
http://dx.doi.org/10.4162/nrp.2012.6.2.113
pISSN 1976-1457 eISSN 2005-6168

Lutein decreases oxidative stress and inflammation in liver and eyes of guinea pigs fed a hypercholesterolemic diet

Jung Eun Kim, Richard M. Clark, Youngki Park, Jiyoung Lee and Maria Luz Fernandez[§]
Department of Nutritional Sciences, University of Connecticut, 3624 Horsebarn Rd ext, Storrs, CT 06269, USA



nutrients
MDPI

Review

Lutein Has a Positive Impact on Brain Health in Healthy Older Adults: A Systematic Review of Randomized Controlled Trials and Cohort Studies

Ayano Yagi [1,2,†], Rui Nouchi [1,2,*,†], Laurie Butler [3] and Ryuta Kawashima [2,4]

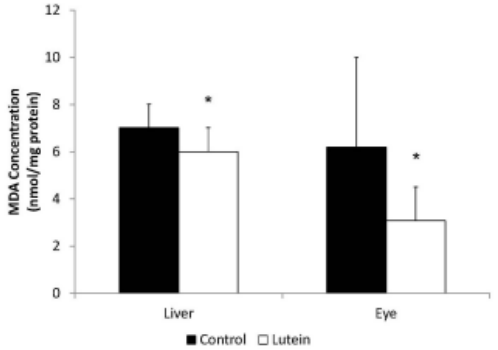


Fig. 2. Malonaldehyde concentrations in liver and in eye of guinea pigs fed control (n = 9) or lutein (n = 10) diets. MDA concentrations were measured by thiobarbituric acid reactive substances (TBARS) * indicates $P < 0.05$.

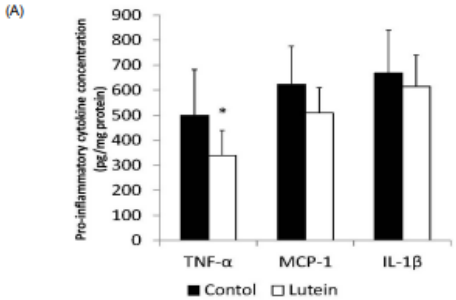


Fig 2: Reduced oxidation: Less Malonaldohyde in liver and eye
Fig A. Reduced inflammation in liver, reduced pro-inflammatory cytokine

So what about low inflammatory diets?

Pro-inflammatory foods	Anti-inflammatory alternatives
Water crackers with camembert cheese	Wholegrain crispbread with hommus
White rice salad	Brown rice, quinoa or freekah salad
Sausages on the BBQ	Fish prepared in foil with lemon juice and extra virgin olive oil on the BBQ
Refined vegetable oil, e.g. safflower oil	Extra virgin olive oil
Iceberg lettuce salad with mayonnaise dressing	Spinach, rocket or kale salad with avocado and blueberries; or tabbouleh or fattoush salads
Potato crisps	Unsalted nuts e.g. walnuts, almonds
White bread	Sourdough, wholegrain and seeded bread

LOW INFLAMMATORY DIET

Chronic inflammation plays a role in diseases such as heart disease, diabetes, asthma, Alzheimer's disease, and fatty liver disease.

These foods can help to reduce chronic inflammation in the body.

Eat Plenty of Anti-inflammatory Foods

Green Leafy Vegetables
Spinach, kale, broccoli, cabbage & many more

Fruits
Including berries & citrus fruits

Olive Oil
Good quality, extra virgin olive oil

Tomatoes
Fresh tomatoes, tomato pastes or purees

Fatty fish
Salmon, Mackerel, Tuna & Sardines

Nuts & Seeds
Walnuts, almonds, pistachio nuts, pumpkin seeds & many more

Water & Herbal Tea
e.g. peppermint, chamomile or ginger tea

Wholegrains
Rolled oats, grainy breads, long grain brown rice, barley & many more

Beans and legumes
Including lentils, chickpeas & kidney beans
& many more

Herbs & spices
Parsley, thyme, celery leaf, rosemary, cloves, nutmeg, cumin & many more

Avoid or Limit Foods that Cause Inflammation

Fried foods
e.g. hot chips & takeaway foods

Sugary drinks & alcohol

Refined carbs
e.g. cakes, biscuits & pastries

Processed meats
e.g. sausages, bacon & deli meats

Butter, ghee & margarine

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Social Connection, family and friends in Ballina

Stay connected, enjoy spending time with family and friends, and take pleasure in good food.

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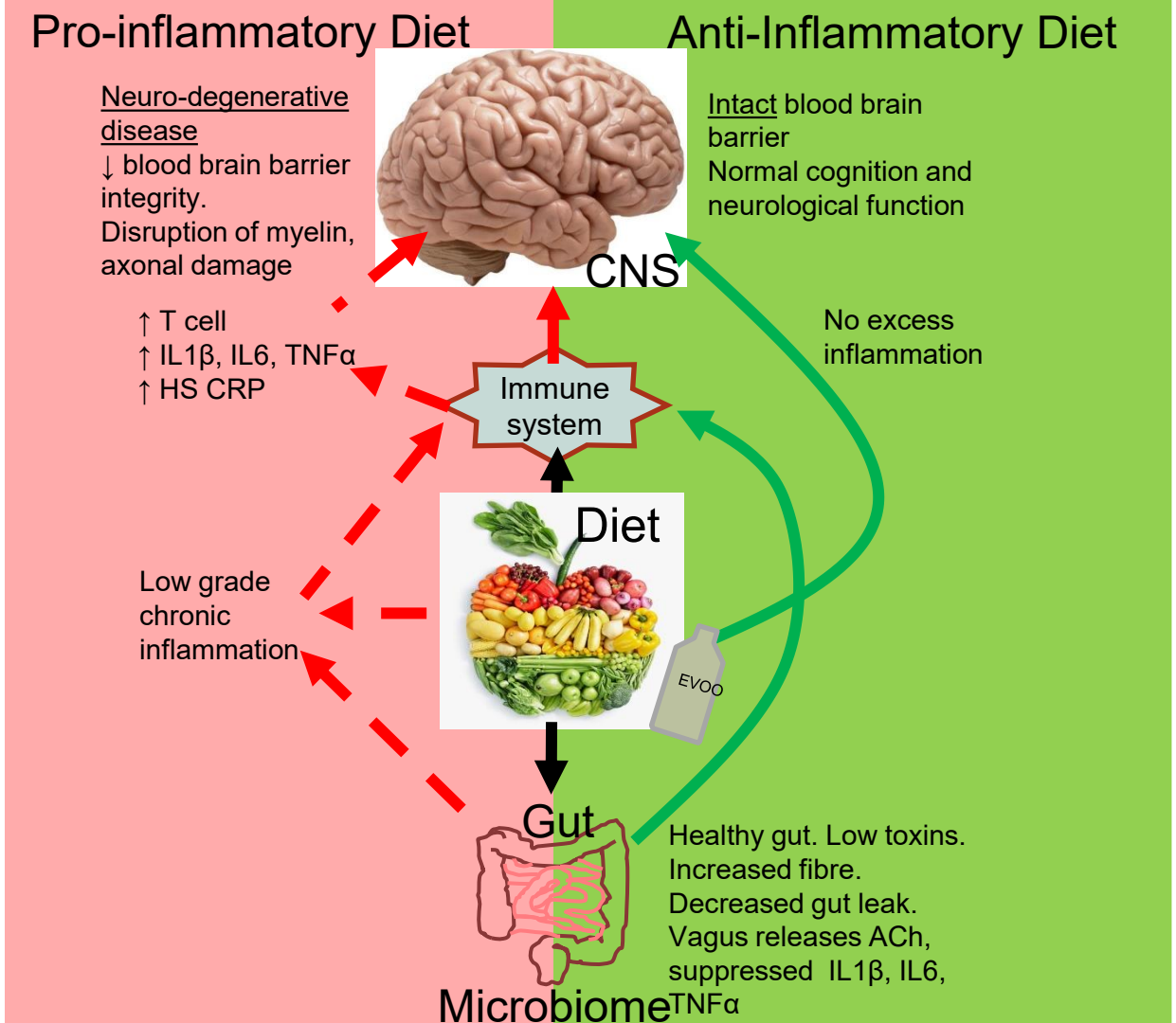
Brain health and inflammation



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