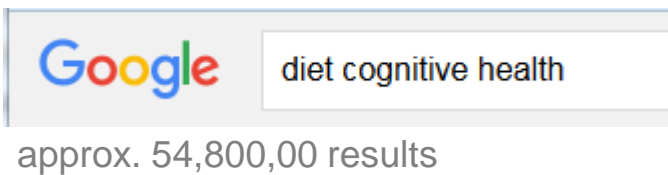
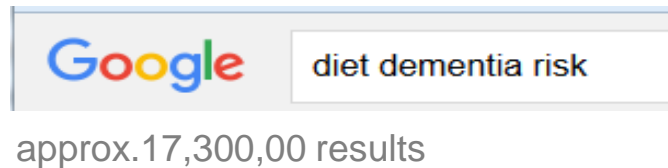




Diet and Dementia Risk

Navigating the hype!

Historically unrivalled **quantity of information** available.

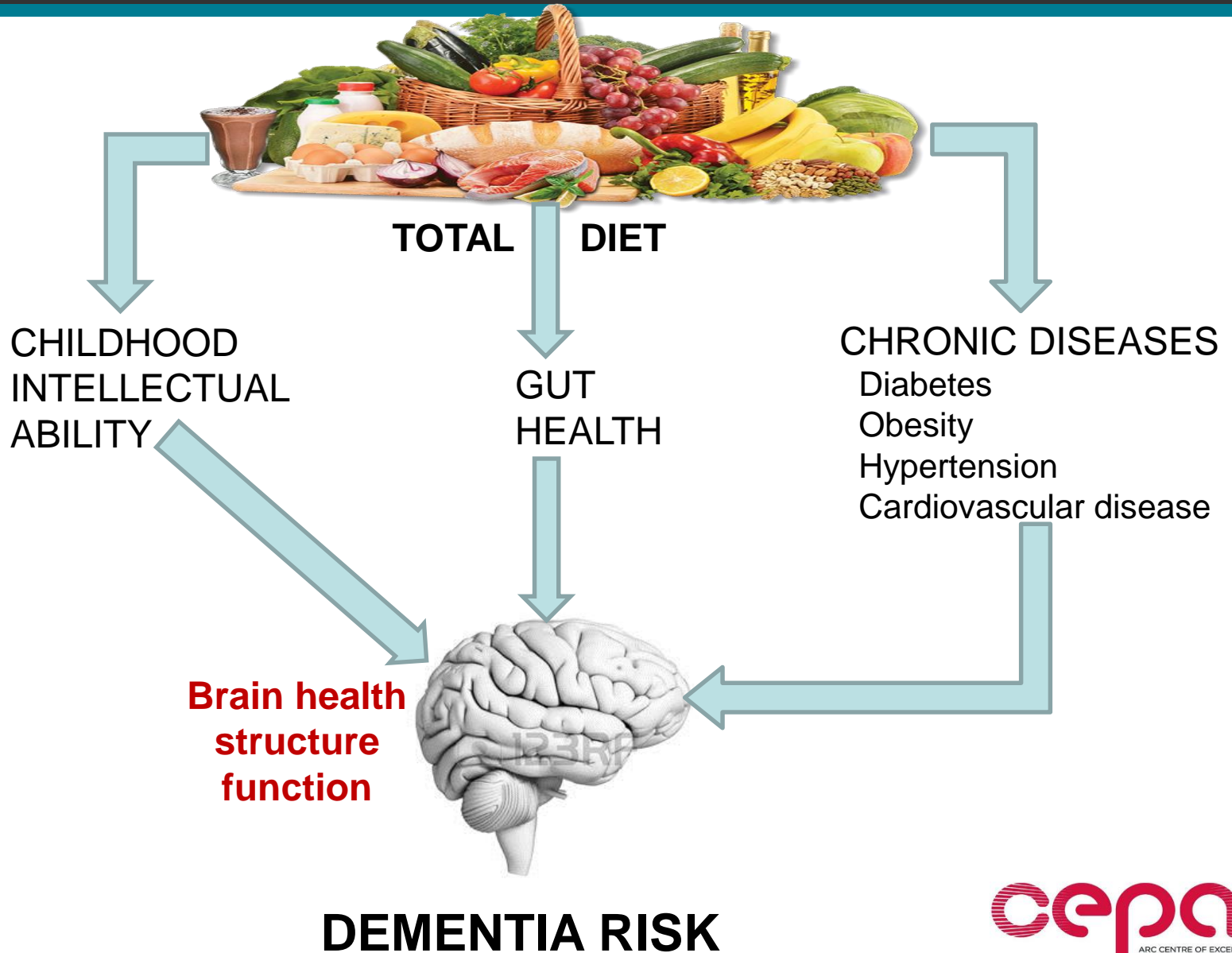


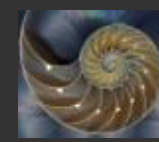
Media reports and popular science sites frequently distort or overstate research findings to support particular agendas.

<http://www.dementiadiet.com/index.html>
**Nutrition, Alzheimer's and Dementia -
Now is the time to Take Control!**

~~.....if you are suffering... from Alzheimer's disease, it is likely that **nutritional deficiencies are one of the primary causes**!"
"In today's world of "enriched" foods, it may come as a surprise to know that pretty much everyone needs basic multivitamin and mineral supplementation"~~

Provide overview of what is known about diet and dementia risk but balanced against the inherent limitations of current evidence.





TOTAL DIET

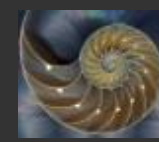
**Nutritional factors act
directly to modify or
exacerbate brain ageing.**



**health,
structure
function**



DEMENTIA RISK

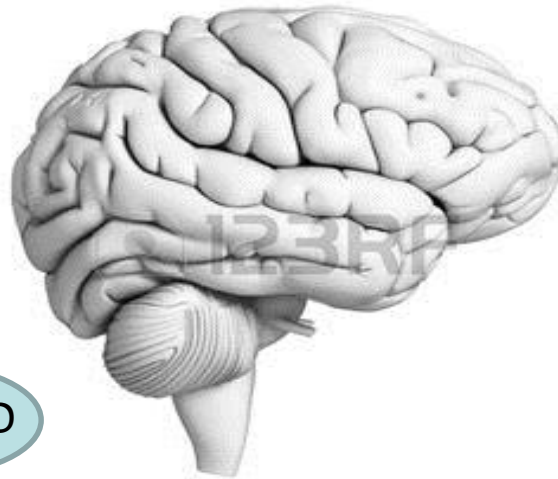


PROTECTIVE

Antioxidant & anti-inflammatory

HARMFUL

Pro-inflammatory pro-oxidative,
Contribute to impaired metabolism,
amyloid burden & neuronal loss



Omega-3 fatty acids

Vitamins B6, B12, folate

Vitamin D

Vitamins E, A, C

Trace elements (zinc, selenium)

Plant flavonoids

Hydrogenated (trans) fat

Simple SUGARS

Refined carbohydrates

High intake saturated fat



Nutrients to reduce risk of cognitive decline or dementia?

- Animal models together with some observational studies indicated nutrient status impacts on cognitive ageing or risk of dementia.
- Over last 20+ yrs numerous clinical trial of relevant nutrients on dementia risk undertaken.
- Evidence from trials does NOT support supplementation with any nutrient(s) to protect against cognitive decline or dementia.

'Effect of Nutrients, Dietary Supplements and Vitamins on Cognition: a Systematic Review and Meta-Analysis of Randomized Controlled Trials (2015)

[Scott C. Forbes](#), PhD, [Jayna M. Holroyd-Leduc](#), MD, [Marc J. Poulin](#), PhD, DPhil, and [David B. Hogan](#), MD

Trials of nutrient supplementation are problematic.

- Length of follow-up
- Timing of intervention (life-period)
- Absorption issues in older-age, dose?
- Initial status, interactions
- Small effects



Taking multiple supplements without medical advice or supervision is not advisable!



Dietary patterns to reduce risk of cognitive decline or dementia?

Alternate approach to examining nutritional impact on outcomes.

- Takes into account interaction between nutrients & their synergistic effects.

Dietary pattern: combination of foods eaten together.

- More easily translatable into practice.

Assessed generally by use of FFQ or food diaries

- May be pre-defined according to dietary guidelines (dietary scores assigned according to adequacy & limitation components).
- Defined statistically according to which foods group together in a particular sample.
The pattern is named according to the foods that define it.

More consistent body of evidence than in nutrient studies

Healthy diets defined by wholegrains, fresh vegetables, fruit, fish with limited sugar and processed foods = better cognition & less decline; reduced risk of dementia or AD.

Dietary patterns, cognitive decline and dementia: A systematic review: [Ondine van de Rest^{3,*}](#), [Agnes AM Berendsen³](#), [Annemien Haveman-Nies](#), and [Lisette CPGM de Groot](#)'

For MedDi 4/6 cross-sectional, 6/12 longitudinal & 3 meta-analyses: other dietary patterns 7/7 cross-sectional 5/7 longitudinal studies.

MEDITERRANEAN DIET

High consumption whole-grains, plant-based foods, olive oil,
Low consumption red meat; limited sweets: no pre-packaged/processed foods.

Reduces risk of chronic diseases associated with dementia.

Favourable impact on brain health and structure (Gu et al. 2015 in WHICAP).

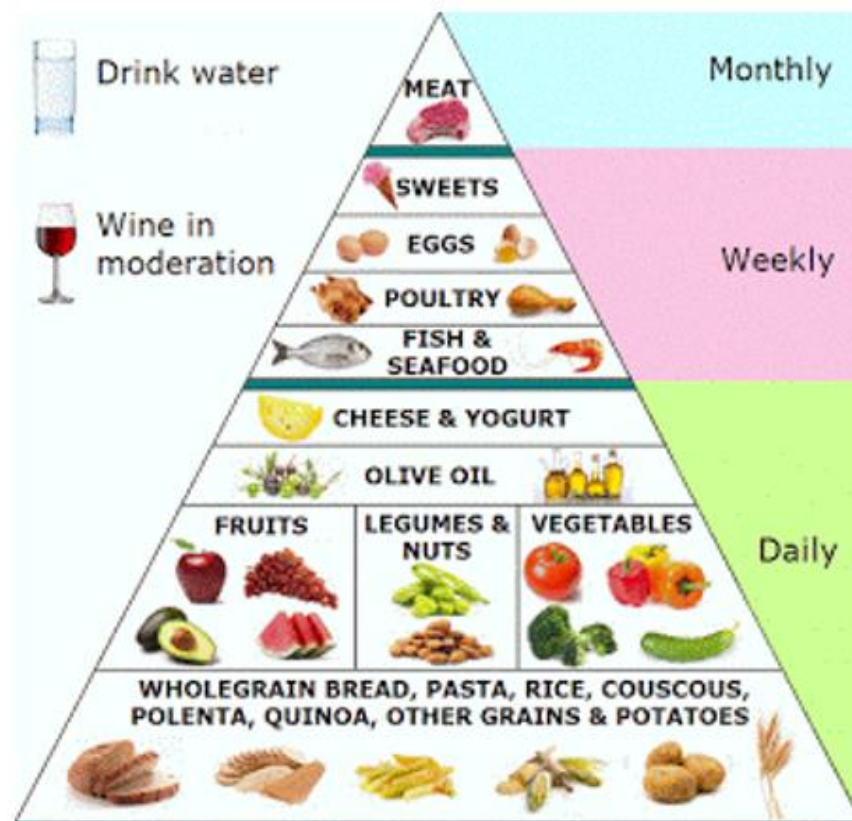
Reduces dementia risk by 34-40% (Lourida et al. 2013 small meta-analysis).

PREDIMED trial (6-yrs)

- Positive effect on MMSE & Clock Drawing in those at vascular risk (M=75yrs) but no baseline cognitive assessment.

The Mediterranean Diet Pyramid

Nutrient profile: antioxidants, complex carbohydrates, monosaturated & polyunsaturated fatty acids





Other protective diets

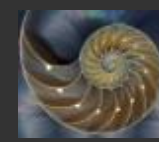
DASH Diet (*Dietary Approaches to Stop Hypertension*).

MIND Diet (*Mediterranean-DASH Intervention for Neurodegenerative Delay*).

Rush Memory & Ageing Project: Older U.S adults (n=923) aged 58-98 over 4.5 yrs. Outcome = risk for AD.

DASH	serving	score	MEDI diet	serving	score	MIND diet	serving	score
Total grains	≥7/d	1	Non-refined Grains	>4/d	5	Wholegrains	>3/d	1
Vegetables	≥4/d	1	Vegetables	>4/d	5	Green Leafy Veg	≥6/wk	1
Fruits	≥4/d	1	Potatoes	>2/d	5	Other Veg	>1/d	1
Dairy	≥2/d	1	Fruits	>3/d	5	Berries	≥2/wk	1
Meat, Poultry, Fish	≥/d	1	Full-fat Dairy	<10/wk	5	Red Meat & Products	<4/wk	1
Nuts, Seeds Legumes	≥4wk	1	Red Meat	1/wk	5	Fish	>1/wk	1
Total fat	27% kcal	1	Fish	>6/wk	5	Poultry	≥2/wk	1
Saturated fat	6% of kcal	1	Poultry	≤3/wk	5	Beans	>3/wk	1
Sweets	<5/wk	1	Legumes, Nuts Beans	>6/wk	5	Nuts	≥5/wk	1
Sodium	<2400 mg/d	1	Olive Oil	≥1/d	5	Fast/Fried food	<1/wk	1
			Alcohol	<300>0 mL/d	5	Olive Oil primary	>1/d	1
						Butter/Margarine	<1/d	1
						Cheese	<1/wk	1
						Pastry/Sweets	<5/wk	1
						Alcohol/Wine	1/d	1
Total DASH Score	Out of	10	Total Med Score	Out of	55	Total MIND score	Out of	15

Morris, M.C., et al. MIND diet associated with reduced incidence of Alzheimer's disease. *Alzheimers Dement.* 2015.



Weighing the evidence

Positive findings for MeDi:

- Mainly from northern U.S population

Diet is a lifestyle behaviour that occurs within particular social and cultural context.

What about Australia?

PATH, AUSDIAB, AIBL

- MeDi not protective against cognitive decline in PATH
- Unpublished findings – not protective in AUSDIAB
- Only for ApoE-e4 carriers in AIBL.



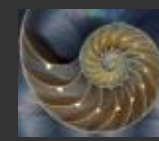
Exciting Australian MeDi research!!

Analysis underway of 6mths MeDi RCT on comprehensive measures of cognitive performance

MedLey Trial

The Mediterranean diet for cognitive function and cardiovascular health in the elderly

Intervention based on traditional Cretan MeDi; control group consumes customary diet.



Weighing the evidence (cont.)

Diet behaviours also cluster with multiple other lifestyle factors.



PHYSICAL ACTIVITY

Physical activity important determinant of dietary effects

- Most studies adjust for physical activity
- Interactions not always examined. For example: High levels moderate dietary impact on AD biomarkers.

SOCIOECONOMIC STATUS

- Impact of dietary patterns on cognitive decline greater with low SES.
- NuAge Study - Quebec

ALCOHOL

Light to moderate drinkers at reduced risk BUT alcohol is a neurotoxin:

Neuroimaging in PATH 60+ cohort

- Higher alcohol consumption = greater brain atrophy in early old age – especially in women.
- Consistent evidence that heavy drinking is detrimental to cognitive health.

Higher alcohol consumption in Western-style nutrient-poor diets;

Moderate alcohol consumption in healthy diets.

- Not all studies statistically adjust for alcohol
Potential to conflate dietary effects with effects driven by alcohol consumption.



Limitations to current knowledge

FFQ captures typical diet over 1-yr. Usually only assessed x1 over a study's duration. Can not account for a life-time of dietary choice.



FREQUENCY of diet measurement

TIMING: diet exposure & outcome



The optimal period for dietary intervention in relation to dementia risk is unknown, as is the long-term effects of change at a given time point on the trajectory for decline.

OUTCOMES



Dementia incidence is generally a well-defined outcome. No standard measures of cognitive decline across studies. Screening tests for impairment (MMSE) are not sensitive to subtle change.



SEX & GENOTYPE

Differences in effect according to sex and ApoE-e4 genotype particularly in relation to fat metabolism.



TO CONCLUDE

- Good theoretical justification for diet to impact on dementia risk.
- Western-style processed diet that is high energy but nutrient poor will increase risk due to causal effect on chronic diseases and promotes brain ageing.
- Tentative support for the protective effect of a Mediterranean-type diet.
- Still many evidence gaps.
- Diet is a lifetime exposure and interacts with numerous other modifiable and non-modifiable factors that in total will determine an individuals' cognitive health in older age.



***Eat food.
Not too much.
Mostly plants.***
(Michael Pollan)