

*Nutrition, an ally for brain health and well-being  
in old age*



*Guylaine Ferland, PhD*  
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**INSTITUT DE  
CARDIOLOGIE  
DE MONTRÉAL**

**Université   
de Montréal**

**CCNA**  
Canadian Consortium  
on Neurodegeneration  
in Aging



**CCNV**  
Consortium canadien en  
neurodégénérescence  
associée au vieillissement

# Background

- ~40% of Canadians > 65 y have memory loss and ~500 000 Canadians live with dementia with ~25,000 new cases diagnosed every year

(Alzheimer's Society of Canada)

- ~1/3 of Alzheimer' diseases cases worldwide might be attributable to potentially modifiable risk factors

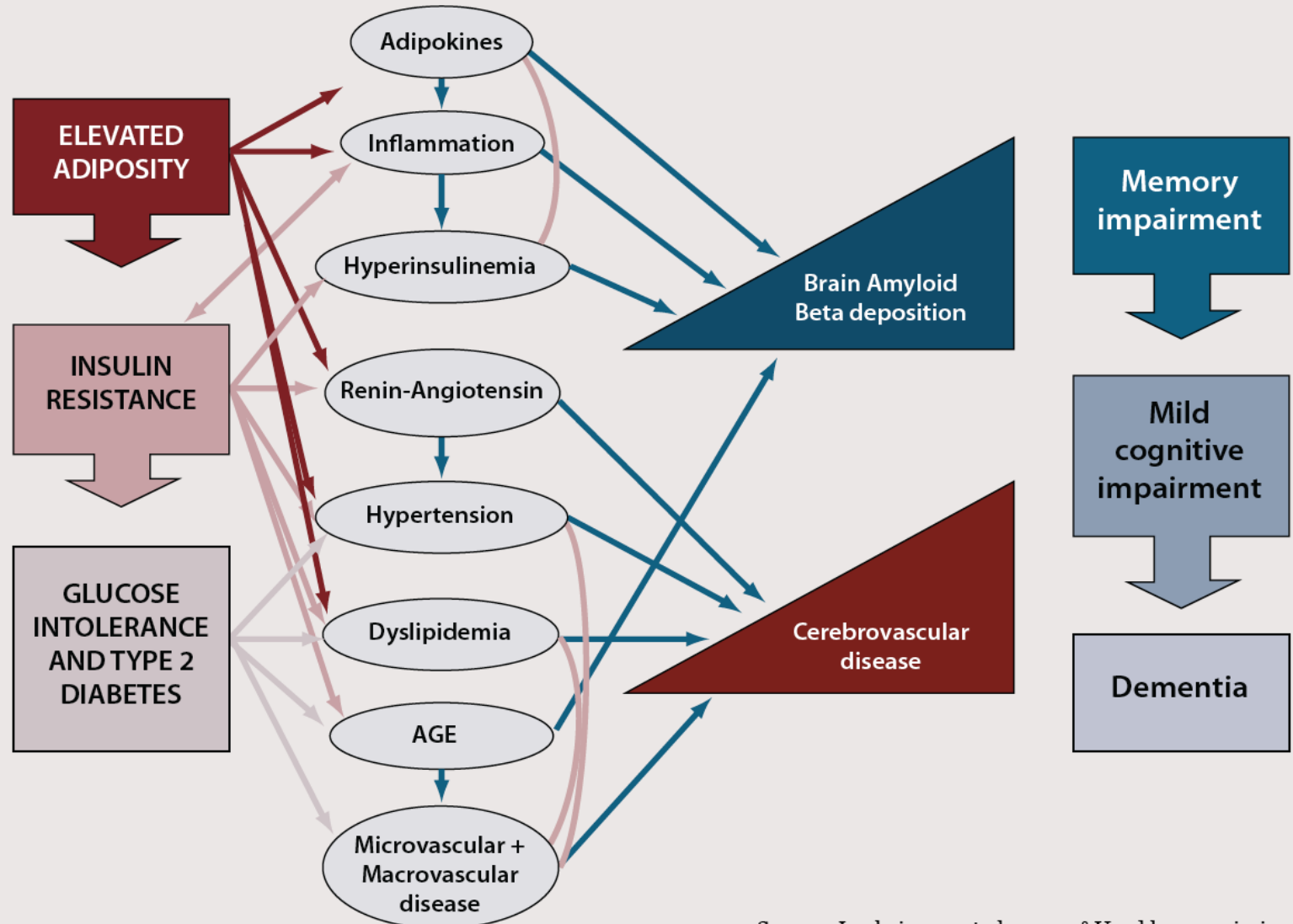
(Norton et al., Lancet Neurol. 13, 788-94, 2014)

- Nutrition is a modifiable factor for diseases that have been linked to dementia i.e. diabetes, CVD

(Riederer P, et al. Neural Transm 2017; 124: 1431–54;  
Santos CY, et al. Alzheimers Dement 2017; 7: 69–87)

# Metabolic components

**Figure 1: Risk factors for cognitive decline and dementia**



# Nutrients in our Food

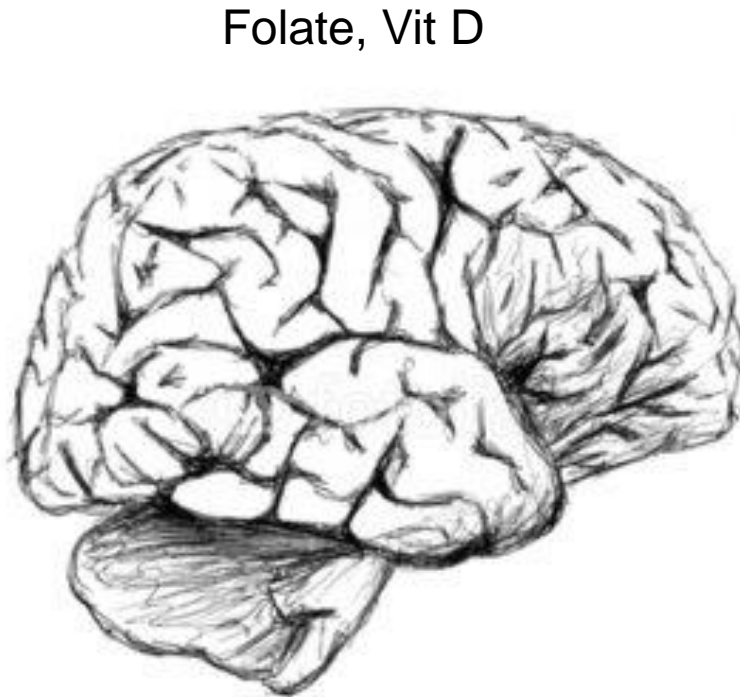
- **Macronutrients:**
  - Protein
  - Carbohydrates
  - Fats
- **Micronutrients:**
  - Vitamins
  - Minerals
  - Antioxidants
- **Water**



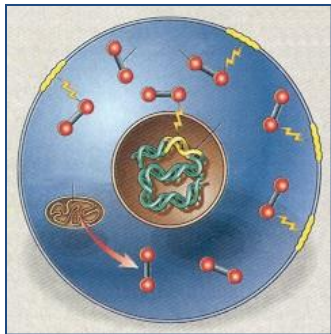
# Nutrients and brain



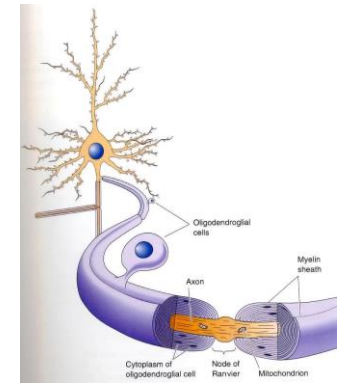
Glucose  
Vit B<sub>1</sub>, B<sub>2</sub>  
Niacin, Fe, I



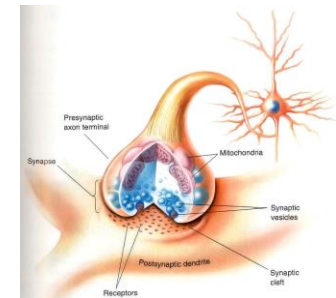
Folate, Vit D



Vit E, C,  $\omega$ -3 FA  
Flavonoids, Carotenoids  
Zn, Cu, Mn, Se



$\omega$ -3 FA  
Vit B<sub>12</sub>  
Pantothem. Ac  
Vit K



Vit B<sub>6</sub>, C, Choline



# Nutrition and prevention of cognitive impairment

*Nikolaos Scarmeas, Costas A Anastasiou, Mary Yannakoulia*

*Lancet Neurol 2018; 17: 1006–15*

Longitudinal studies and clinical trials reporting clinical outcomes:  
i.e, cognitive performance, MCI, dementia, dementia types

- Longitudinal studies, minimum sample size ~1000 participants;  
clinical trials ~100 participants
- Minimum follow-up of 6 months

# B Vitamins



Observational studies

Clinical trials

## Nutrients

B vitamins

B6



B12



Folate



B vitamins combination



- B vitamins → role in homocysteine (Hy) metabolism and its association with cognitive decline
  - even moderately raised (within the normal range) Hy might be assoc. with ↑ risk dementia in people >65 years.

(Smith AD, et al. J Alzheimers Dis 2018; 62: 561–70)

# Antioxidants



Observational studies

Clinical trials

## Nutrients

### Antioxidants

Carotenoids



Vitamin C



Vitamin E



Selenium



Copper



Flavonoids/polyphenols



Anthocyanidins



Multiantioxidant supplementation



The brain is highly susceptible to oxidative damage

- Oxidative stress or inadequate antioxidant defence may mediate the pathogenesis of dementia

(Mecocci P, et al. J Alzheimers Dis 2018; 62: 1319–35)



# Vitamin D



Observational studies

Clinical trials

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**Nutrients**

Vitamin D



Vitamin D has been related to multiple neurobiological pathways:

- Protection from inflammation-induced neurodegeneration
- ↓ amyloid- $\beta$  production and ↑ clearance

(Anastasiou CA, et al. J Alzheimers Dis 2014; 42 (suppl 3): S71–80)

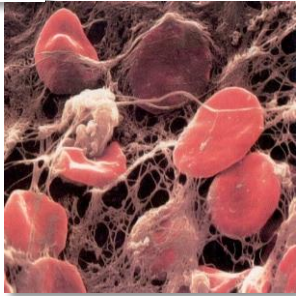
# Vitamin K

## Phylloquinone

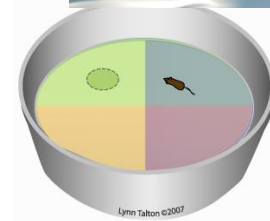
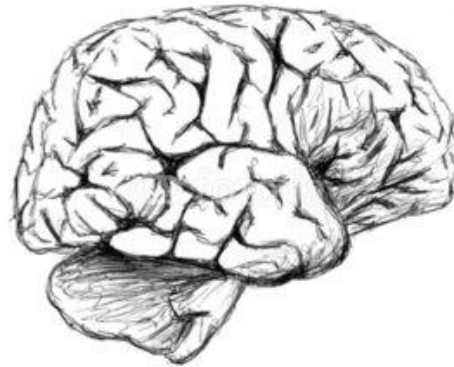
- Green vegetables  
⇒ 45-60% daily VK intake
- Oils (canola, soya, olive)
- Legumes (soya, lentils)
- Herbs



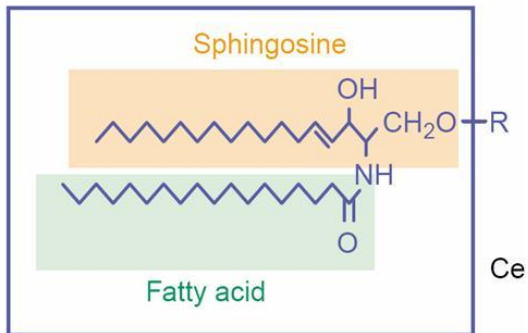
# Vitamin K in brain



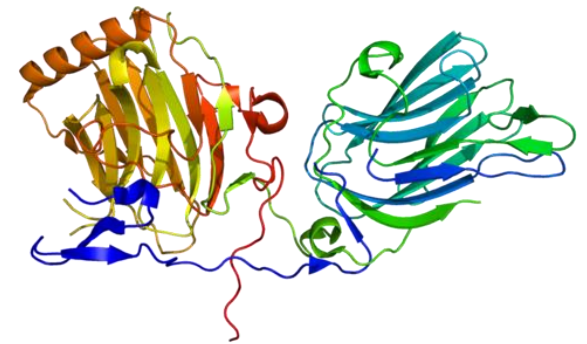
Coagulation/  
vascular integrity



Cognition



Sphingolipids



Cell signaling i.e. Gas 6

## RESEARCH



### Research and Professional Briefs

# Low Vitamin K Intakes in Community-Dwelling Elders at an Early Stage of Alzheimer's Disease

NANCY PRESSE, DtP\*; BRYNA SHATENSTEIN, PhD, PDt\*; MARIE-JEANNE KERGOAT, MD; GUYLAINE FERLAND, PhD

(Presse N et al. JADA 2008; 108: 2095-2099)

# Vitamin K and AD

	Vitamin K intakes			
	Controls (n=31)		Patients (n=31)	
Descriptive Statistics	(µg/day)	(µg/1000 kcal)	(µg/day)	(µg/1000 kcal)
Arithmetic mean (X ± SD)	139 ± 233	76.1 ± 118.1	63 ± 90	39.9 ± 50.7
Median	71	39.9	38	25.4
Range	2-1797	1.6-903.0	2-670	0.8-353.3

## Adequate intake

F: 90 µg

H: 120 µg

# Food groups

Food category	Mean relative contribution <sup>b</sup> (%)	
	Controls (n=31)	Patients with AD <sup>c</sup> (n=31)
Green vegetables (including herbs)	49	33*
Other vegetables	14	18
Fats and dressings	12	13
Fruits	9	8
Mixed dishes and soups	6	10
Baked goods and cereals	5	8
Meat	4	4
Other foods	1	6

**Research and Professional Briefs**

# Validation of a Semi-Quantitative Food Frequency Questionnaire Measuring Dietary Vitamin K Intake in Elderly People

NANCY PRESSE, DtP\*; BRYNA SHATENSTEIN, PhD, PDt\*; MARIE-JEANNE KERGOAT, MD; GUYLAINE FERLAND, PhD

(Presse N, et al. JADA 2009; 109: 1251-1255)

Article

## Dietary Vitamin K Intake Is Associated with Cognition and Behaviour among Geriatric Patients: The CLIP Study

Justine Chouet <sup>1</sup>, Guylaine Ferland <sup>2</sup>, Catherine Féart <sup>3,4</sup>, Yves Rolland <sup>5</sup>, Nancy Presse <sup>2</sup>, Kariane Boucher <sup>2</sup>, Pascale Barberger-Gateau <sup>3,4</sup>, Olivier Beauchet <sup>1</sup> and Cedric Annweiler <sup>1,6,\*</sup>

Maturitas 93 (2016) 131–136



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Contents lists available at [ScienceDirect](http://ScienceDirect)

Maturitas

journal homepage: [www.elsevier.com/locate/maturitas](http://www.elsevier.com/locate/maturitas)



Increased dietary vitamin K intake is associated with less severe subjective memory complaint among older adults



Anne Soutif-Veillon <sup>a</sup>, Guylaine Ferland <sup>b</sup>, Yves Rolland <sup>c</sup>, Nancy Presse <sup>b</sup>, Kariane Boucher <sup>b</sup>, Catherine Féart <sup>d,e</sup>, Cedric Annweiler <sup>f,g,\*</sup>





2013;34:2777-83

## Vitamin K status and cognitive function in healthy older adults

Nancy Presse<sup>a,b</sup>, Sylvie Belleville<sup>a,c</sup>, Pierrette Gaudreau<sup>d,e</sup>, Carol E. Greenwood<sup>f</sup>, Marie-Jeanne Kergoat<sup>a,d</sup>, Jose A. Morais<sup>g</sup>, H el ene Payette<sup>h</sup>, Bryna Shatenstein<sup>a,b</sup>, Guylaine Ferland<sup>a,b,\*</sup>

### Background

- Vit K/cognition/aging → animal studies (Carri e et al. J Nutr 2011)
- Lower VK intakes in patients initial stages of AD (Presse et al. JADA 2008)
- n= 320
- Exclusion criteria: conditions that could impair cognition i.e. Parkinson's dis, history of stroke or cerebral hemorrhage, Coumadin
- Inclusion criteria: understand/speak French, 3MS>85

### Sample

RAMQ

n=1,793 men/women

67-84 y at study entry

Sites:Montréal/Sherbrooke

### Eligibility

Good phys. & mental health

Functional independence

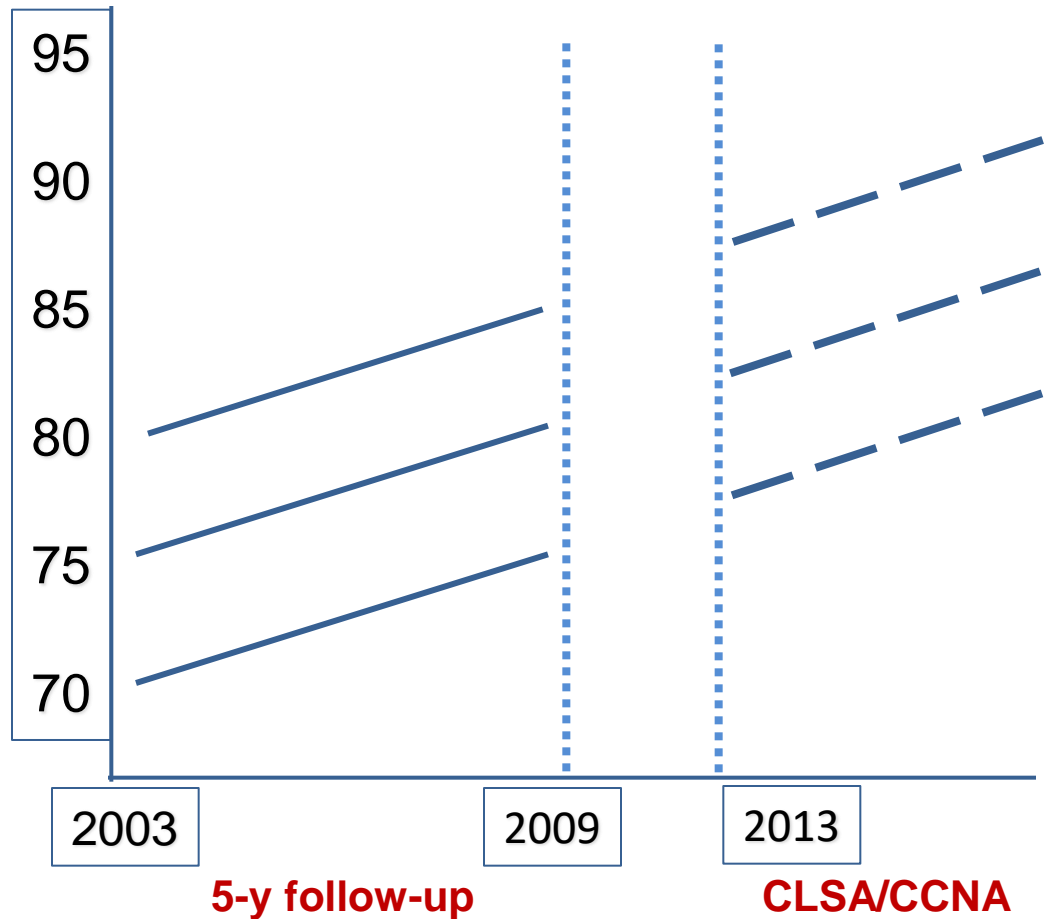
No cognitive impairment

i.e. 3MS > 79

### Follow-up

Face-to-face interview: 1/y

Telephone interview: 2/y



# Vitamin K status and cognition

Cognitive Test <sup>3</sup>	Base Model <sup>1</sup>		Full Model <sup>2</sup>	
	$\beta$ coefficients for serum phylloquinone (95% CI) <sup>3</sup>	<i>P</i>	$\beta$ coefficients for serum phylloquinone (95% CI) <sup>3</sup>	<i>P</i>
RL/RI-16 Free and Cued Recall Task <sup>4</sup>				
Free recall, Trial 1	0.24(-0.12 to 0.59)	0.19	0.21 (-0.14 to 0.57)	0.24
Free recall, Trial 2	0.49 (0.15 to 0.83)	0.005	0.47 (0.13 to 0.82)	0.007
Free recall, Trial 3	0.43 (0.09 to 0.77)	0.01	0.41 (0.06 to 0.75)	0.02
20-min delayed free recall	0.51 (0.16 to 0.85)	0.004	0.47 (0.12 to 0.82)	0.009
Key Complex-Figure <sup>5</sup>				
Copy	0.02 (-0.33 to 0.38)	0.90	0.00 (-0.36 to 0.36)	1.00
3-min recall	0.28 (-0.06 to 0.62)	0.11	0.23 (-0.11 to 0.58)	0.18
20-min delayed recall	0.23 (-0.12 to 0.57)	0.19	0.19 (-0.16 to 0.53)	0.29
Stroop Test <sup>6</sup>				
Plate 1, dots	0.30 (-0.06 to 0.66)	0.10	0.27 (-0.09 to 0.62)	0.14
Plate 2, words unrelated to color	0.06 (-0.22 to 0.34)	0.68	0.04 (-0.24 to 0.33)	0.76
Plate 3, color-words	-0.11 (-0.42 to 0.20)	0.49	-0.11 (-0.43 to 0.21)	0.49
Adapted Brown-Peterson procedure <sup>7</sup>	-0.06 (-0.41 to 0.30)	0.76	-0.05 (-0.42 to 0.31)	0.77
Choice-Reaction Time	0.26 (-0.11 to 0.64)	0.17	0.17 (-0.20 to 0.55)	0.37
WAIS-III Digit Symbol-Coding subtest <sup>8</sup>	0.14 (-0.21 to 0.49)	0.44	0.14 (-0.22 to 0.50)	0.44

→ Significant association between phylloquinone exposure and verbal episodic memory

(Presse N et al. Neurobiol Aging 2013)

# Macronutrients



Observational studies

Clinical trials

## Nutrients

### Macronutrients

Total carbohydrates

Total proteins

Total dietary fat

Saturated fatty acids

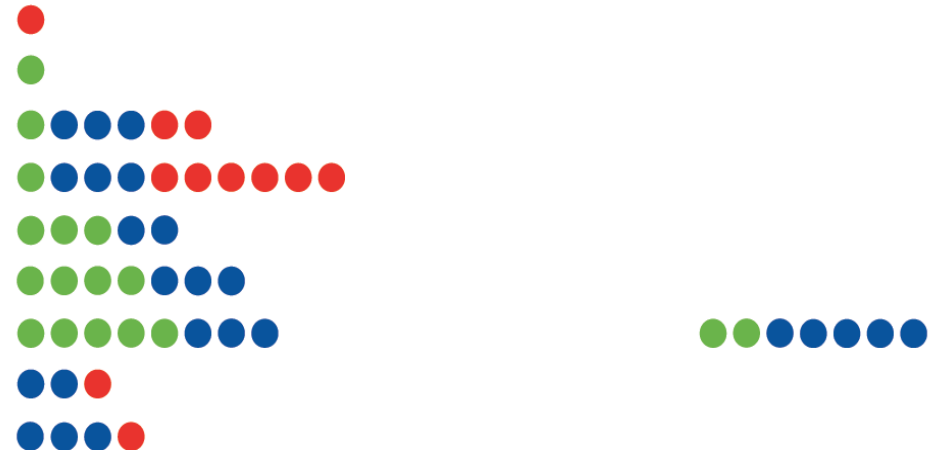
Total polyunsaturated fatty acids

Monounsaturated fatty acids

n-3 polyunsaturated fatty acids

Trans fatty acids

Cholesterol



## Lipids:

- Role in CVD & cerebrovascular health
- n-3 (DHA, EPA,  $\alpha$ -linolenic ac) – neuronal membranes; anti-inflammatory and neuroprotective functions; neuronal plasticity

# Food Groups



Observational studies

Clinical trials

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## Food groups and beverages

Fish and seafood



Meat



Vegetables



Fruits



Fruits and vegetables



Juices



Legumes



Dairy



Olive oil



Nuts





# Beverages



Observational studies

Clinical trials

## Food groups and beverages

### Alcohol

- Moderate total intake vs abstinence
- Moderate vs high total intake
- Moderate wine consumption
- Moderate beer consumption
- Moderate other spirit consumption



### Coffee and tea

- Coffee
- Tea
- Caffeine



- Alcohol → protective role in CVD
- Coffee/Tea → source polyphenols; antioxidant; anti-inflammatory; neuroprotective

# Dietary patterns



Observational studies

Clinical trials

## Dietary patterns

Mediterranean diet



DASH diet



MIND diet



Alternative Healthy Eating Index



Dietary Quality Score



WHO's Healthy Diet Indicator



Healthy Eating Index



Nordic diet



Low-carbohydrate, high-protein diet



Population-specific prudent diet patterns



Multidomain interventions



# Mediterranean Diet

## FOOD GROUPS

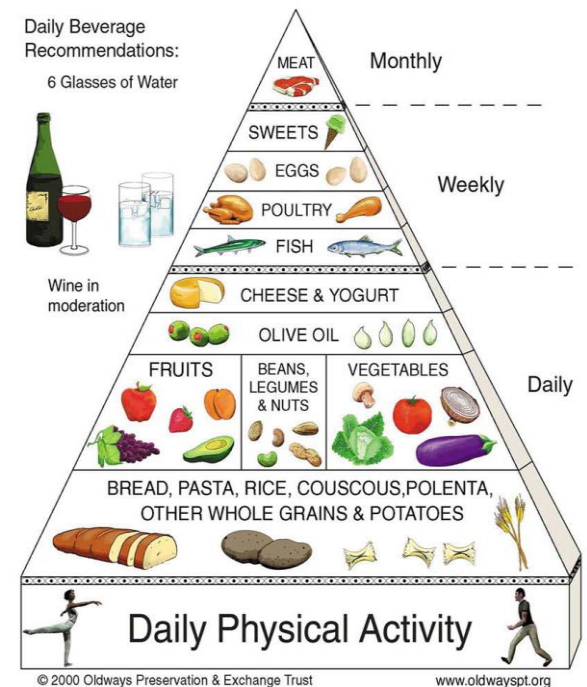
BALANCED INTAKE → fruits, vegetables, whole grains, olive oil

EVERYDAY INTAKE → fermented dairy, nuts, seeds, herbs or spices

EMPHASIS → plant proteins (legumes) ; seafood instead of red meat

IN MODERATION → wine

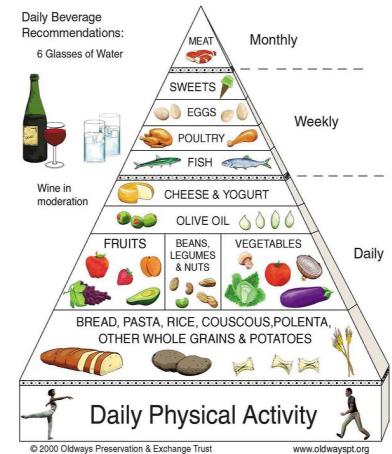
## The Traditional Healthy Mediterranean Diet Pyramid





# Mediterranean Diet

The Traditional Healthy  
Mediterranean Diet Pyramid



- MeDi
  - slower cognitive decline
  - ↓ risk of MCI & dementia
  - ↓ risk progression of MCI → dementia
- PREDIMED-NAVARRA: MeDi enriched olive oil or nuts;  
follow-up 4.1- 6.5 y
  - Better scores on MMSE + clock drawing test

# DASH

## Dietary Approaches to Stop Hypertension

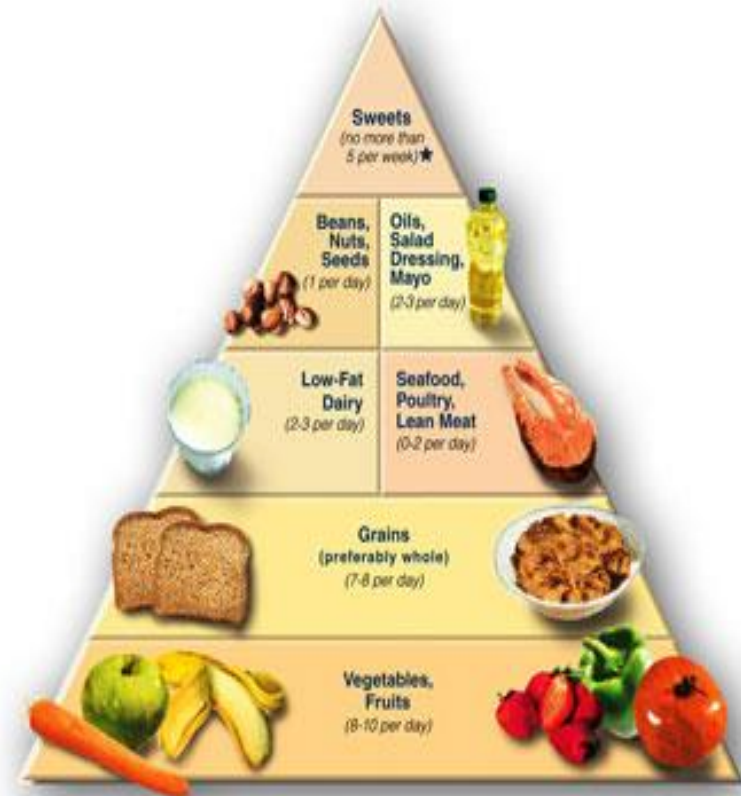
### FOOD GROUPS

HIGH INTAKE → fruits, vegetables, low-fat dairy products, whole grains

REASONABLY HIGH INTAKE → lean animal protein but low intake of red meat

EMPHASIS → foods low in saturated and trans lipids, sodium

### The DASH Food Pyramid



Choose salt-free or low-salt foods from all categories.  
(\* servings (tend to be petite) - applies to all other categories)

# MIND






## Mediterranean-DASH Intervention for Neurodegenerative Delay

### FOOD GROUPS

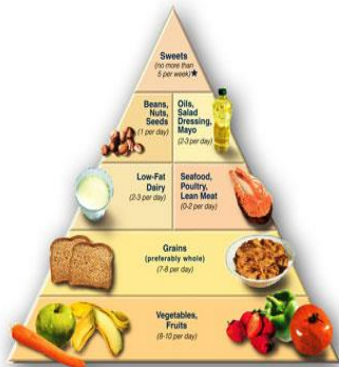
INCREASED INTAKE → green leafy or other vegetables, nuts, berries, beans, wholegrains, fish, poultry, olive oil, wine

DECREASED INTAKE → red meats, butter, stick margarine, cheese, pastries, sweets, fried or fast foods

## THE MIND DIET

	<b>3 PORTIONS OF WHOLEGRAINS A DAY</b>
	<b>1 DARK GREEN SALAD AND 1 OTHER VEGETABLE A DAY</b>
	<b>BERRIES AT LEAST TWICE A WEEK</b>
	<b>AT LEAST 30 GRAMS OF NUTS PER DAY</b>
	<b>BEANS OR LEGUMES AT LEAST EVERY OTHER DAY</b>
	<b>POULTRY AT LEAST TWICE A WEEK</b>
	<b>FISH AT LEAST ONCE A WEEK</b>
	<b>AT LEAST 140ML OF RED WINE EVERY DAY</b>
	<b>NO MORE THAN 1 TBSP A DAY OF BUTTER OR MARGARINE CHOOSE OLIVE OIL INSTEAD</b>
	<b>CHEESE, FRIED FOOD AND FAST FOOD NO MORE THAN ONCE A WEEK</b>
	<b>PASTRIES AND SWEETS LESS THAN 5 TIMES A WEEK</b>

The DASH Food Pyramid



Choose salt-free or low-salt foods from all categories.  
(\* servings tend to be petite) - applies to all other categories!

# DASH - MIND

## THE MIND DIET



- DASH
  - slower cognitive decline
  - ↓ risk of Alzheimer's disease
- MIND
  - Slower cognitive tests (battery of tests)
  - ↓ risk of Alzheimer's disease



REVIEW

# The Mediterranean, Dietary Approaches to Stop Hypertension (DASH), and Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND) Diets Are Associated with Less Cognitive Decline and a Lower Risk of Alzheimer's Disease—A Review

Annelien C van den Brink, Elske M Brouwer-Brolsma, Agnes AM Berendsen, and Ondine van de Rest

*Division of Human Nutrition and Health, Wageningen University, Wageningen, Netherlands*

*Adv Nutr 2019;10:1040–1065*



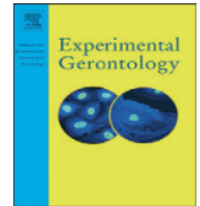
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Review

## Nutrition and the ageing brain: Moving towards clinical applications

Emma Flanagan<sup>a,1</sup>, Daniel Lamport<sup>b,1</sup>, Lorraine Brennan<sup>c</sup>, Philip Burnet<sup>d</sup>, Vittorio Calabrese<sup>e</sup>, Stephen C. Cunnane<sup>f,g,h</sup>, Martijn C. de Wilde<sup>i</sup>, Louise Dye<sup>j,k</sup>, Jonathan A. Farrimond<sup>l</sup>, Nancy Emerson Lombardo<sup>m</sup>, Tobias Hartmann<sup>n</sup>, Thomas Hartung<sup>o,p</sup>, Marko Kalliomäki<sup>q</sup>, Gunther G. Kuhnle<sup>r</sup>, Giorgio La Fata<sup>s</sup>, Aleix Sala-Vila<sup>t,u</sup>, Cécilia Samieri<sup>v</sup>, A. David Smith<sup>w</sup>, Jeremy P.E. Spencer<sup>r</sup>, Sandrine Thuret<sup>x</sup>, Kieran Tuohy<sup>y</sup>, Silvia Turrioni<sup>z</sup>, Wim Vanden Berghe<sup>A</sup>, Martin Verkuijl<sup>B</sup>, Karin Verzijden<sup>C</sup>, Mary Yannakoulia<sup>D</sup>, Lucie Geurts<sup>E</sup>, David Vauzour<sup>a,\*</sup>

*Ageing Res Rev 62 (2020) 101079*



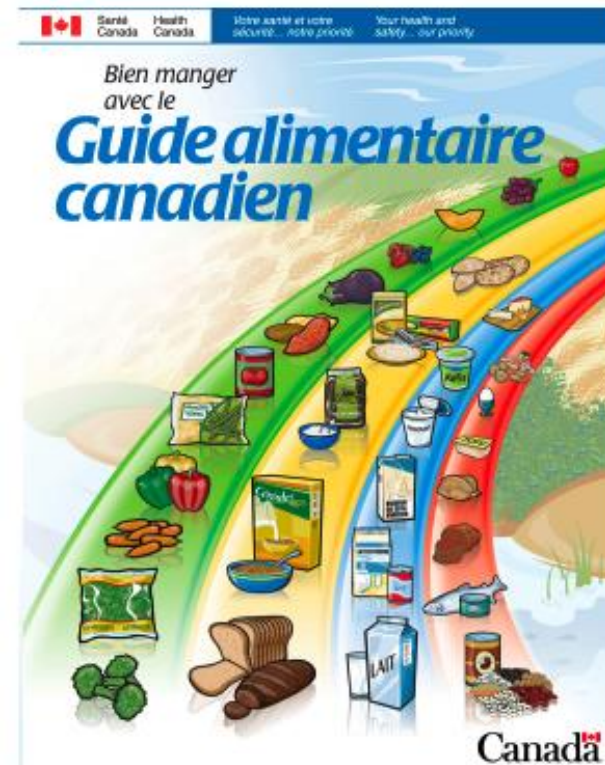
## Diet quality and cognition among older adults from the NuAge study

Bryna Shatenstein <sup>a,b,\*</sup>, Guylaine Ferland <sup>a,b</sup>, Sylvie Belleville <sup>b,c</sup>, Katherine Gray-Donald <sup>d</sup>,  
Marie-Jeanne Kergoat <sup>b,e</sup>, José Morais <sup>f</sup>, Pierrette Gaudreau <sup>g</sup>, Hélène Payette <sup>h,i</sup>, Carol Greenwood <sup>j,k</sup>

### cHEI

- Food groups(4)
- Total lipid intake
- Saturated fat intake
- Cholesterol intake
- Sodium intake
- Food variety

Score: /100



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## Prudent pattern

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Vegetables

Fruits

Fatty fish

Lower-fat dairy products

Poultry

Legumes



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## Western pattern

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Beef

Potatoes

White bread

Baked goods

Processed meats

Higher-fat dairy products

Salty snacks



# **Relationship between Diet Quality and Cognition Depends on Socioeconomic Position in Healthy Older Adults<sup>1-3</sup>**

Matthew D. Parrott,<sup>4,5</sup> Bryna Shatenstein,<sup>6,10</sup> Guylaine Ferland,<sup>6,10</sup> H el ene Payette,<sup>7</sup> Jos e A. Morais,<sup>8,9</sup> Sylvie Belleville,<sup>6,11</sup> Marie-Jeanne Kergoat,<sup>6,12</sup> Pierrette Gaudreau,<sup>12,13</sup> and Carol E. Greenwood<sup>4,5\*</sup>





## Simple diet changes have a powerful effect on brain health

The Brain Health Food Guide is for adults who want to retain cognitive function and brain health as they age. The guide is based on studies of adults 50 years of age and older who changed their diet and found these benefits:

- After four months of eating well, they performed as if they were nine years younger on tests of reading and writing speed<sup>1</sup>
- After four years of eating well, they did not experience any memory loss<sup>2</sup>

Dietary patterns similar to the Brain Health Food Guide are associated with:

- 36 percent lower risk of developing Alzheimer's disease<sup>3</sup>
- 27 percent lower risk of developing mild cognitive impairment or pre-dementia<sup>3</sup>

With a nutritious variety of vegetables, fruit, whole grains, beans, fish, nuts and low-fat dairy products, the Brain Health Food Guide offers the same eating plan that's recommended to prevent or treat heart disease, diabetes, high cholesterol, high blood pressure and other conditions.

Consult with your health care provider to help you adapt these recommendations to meet your specific needs.



## Eating for brain health is all about..

- Embracing balance, moderation and variety (see back for guide)
- Focusing on an overall pattern of healthy eating, not one one specific "superfood" for brain health
- Making sure you eat until you are comfortably full and not stuffed
- Enjoying lots of vegetables and fruit
- Eating raw leafy vegetables daily, including lettuce, kale and spinach
- Eating fish, beans, and nuts several times a week
- Including healthy fats in the diet, from olive oil, nuts and fish
- Limiting red and processed meat
- Selecting low-fat dairy products, such as milk and yogurt
- Choosing whole grains over refined grains e.g. white bread

## Resources

**Recipes & Healthy Eating**  
Dietitians of Canada  
[www.cookspiration.com](http://www.cookspiration.com)

Heart & Stroke Foundation  
[www.heartandstroke.com](http://www.heartandstroke.com)

Canadian Diabetes Association  
[www.diabetes.ca/diabetes-and-you/recipes](http://www.diabetes.ca/diabetes-and-you/recipes)

EatRight Ontario  
[www.eatrightontario.ca](http://www.eatrightontario.ca)

HealthLink BC  
[www.healthlinkbc.ca/healthyeating](http://www.healthlinkbc.ca/healthyeating)

**Preventing Dementia**  
Alzheimer Society of Canada  
[www.alzheimer.ca/en/Living-widementia/BrainBooster](http://www.alzheimer.ca/en/Living-widementia/BrainBooster)



- **Choose colour.** Include colourful fruits and vegetables at each meal
- **Grill, steam and bake** foods instead of deep frying
- **Stock your kitchen** with a variety of dried or canned beans, frozen or canned fish, frozen vegetables and fruits
- **Add beans or legumes** to soups, stews and stir-fries
- **Snack smart.** Reach for nuts, fresh fruit, cut up vegetables and low fat yogurt
- **Keep hydrated.** Drink water or unsweetened beverages

Developed by: Dr. Matthew Parrott  
in collaboration with members of the Canadian Consortium on Neurodegeneration in Aging:  
Team 6: Nutrition, Exercise and Lifestyle

### Team 6 Member Organizations:

Baycrest Health Sciences, Concordia University, Institut Universitaire de Geriatrie de Montreal, Centre de recherche du Centre hospitalier de l'Université de Montreal, McGill University, Rotman Research Institute, Ryerson University, Sunnybrook Health Sciences Centre, Toronto Rehab/UHN Cardiovascular Rehabilitation Program, Université de Montreal, Université de Sherbrooke, University Health Network, Toronto, University of British Columbia, University of Ottawa, University of Toronto, Waterloo University

### Supporting Evidence:

1. Smith PJ, Blumenthal, JA, Babyak MA, et al. Effects of the dietary approaches to stop hypertension diet, exercise, and caloric restriction on neurocognition in overweight adults with high blood pressure. *Hypertension*. 2010;55:1331-1338.
2. Valls-Pedret C, Sala-Vila A, Serra-Mir, et al. Mediterranean diet and age-related cognitive decline: a randomized trial. *JAMA Internal Medicine*. 2015;175(7):1084-1103.
3. Singh B, Passaak AK, Melke MM, et al. Association of Mediterranean diet with mild cognitive impairment and Alzheimer's disease: a systematic review and meta-analysis. *J Alzheimers Dis*. 2014;39:271-292.



## Which Foods Help the Brain?



**BRAIN HEALTH**  
FOOD GUIDE

An Evidence-Based Approach to Healthy Eating for the Aging Brain

English: <http://ccna-ccnv.ca/news/brain-health-food-guide-lower-risk-dementia/>

French: <http://www.rqrv.com/fr/index.php>



### Foods to Include

### Servings

### Serving Size

#### Vegetables Total

5 or more times a day

Of this, be sure to include:

#### Raw Leafy Greens

(e.g. lettuce, spinach, mixed greens, kale, cabbage)

1 time a day

1/2 cup  
except 1 cup for  
Raw Leafy Greens

#### Cruciferous Vegetables

(e.g. broccoli, cauliflower, Brussels sprouts, kale, cabbage, bok choy)

3 times a week

#### Fruit Total

4 or more times a day

Of this, be sure to include:

#### Berries

(fresh or frozen)

3 times a week

1 medium fruit  
or  
1/2 cup

#### Unsalted Nuts or All-natural Nut Butters Total

(e.g. almond butter, peanut butter)

1 time a day

Of this, be sure to include:

#### Walnuts

4 or more times a week

1/4 cup nuts  
or  
2 tbsp nut butter

#### Beans or Legumes

(e.g. chickpeas, kidney beans, lentils, navy beans)

2 or more times a week

1/2 cup

#### Fish or Seafood Total (not battered or fried)

3 times a week

Of this, be sure to include:

#### Fatty fish

(e.g. salmon, trout, sardines)

1 or more times a week

3-4oz

- Choose whole grains (e.g. oats, brown rice, brown pasta, 100% whole wheat or whole grain breads, quinoa, bulgur, barley, whole grain pasta) instead of refined grains (e.g. white rice, white pasta, white bread)
- Use low-fat milk (skim or 1%), yogurt (0-2%), and cheese (about 22%)
- Use extra-virgin olive oil as your main culinary oil for cooking, salad dressings, and added to bread and foods



### Foods to Limit

### Servings

### Serving Size

#### Any Meat and Poultry Total

No more than 1 meal per day should include meat or poultry

1 or less per day

Of this, be sure to limit:

**Red and processed meats** (e.g. beef, pork, lamb, liver, sausages, hot dogs, jerky, cold cuts, pepperoni)

less than 1 per week

3-4oz

#### Butter, cream, or high fat dairy spreads

(e.g. sour cream, cream cheese)

less than 1 per week

1tsp butter  
1tbsp cream

**White breads** (e.g. bread, rolls, bagels, pita, tortilla)

1 or less per week

1 slice bread  
1/2 bagel

**Pre-packaged foods and meals** (e.g. canned soup, instant noodles, frozen appetizers, and entrees)

**Potato chips, fries, pretzels, or other salty snacks or fried food**

3 or less servings per week in total for all these foods

**Store-bought dairy desserts** (e.g. ice cream, frozen yogurt, pudding, custard)

**Baked goods** (especially store bought) (e.g. cookies, muffins, scones, croissants, donuts, cakes, pies)

Serving sizes according to the Nutrition Facts table on the food label

**Candy and chocolate**

**Pop, sweetened fruit juice or any other sugary drink**



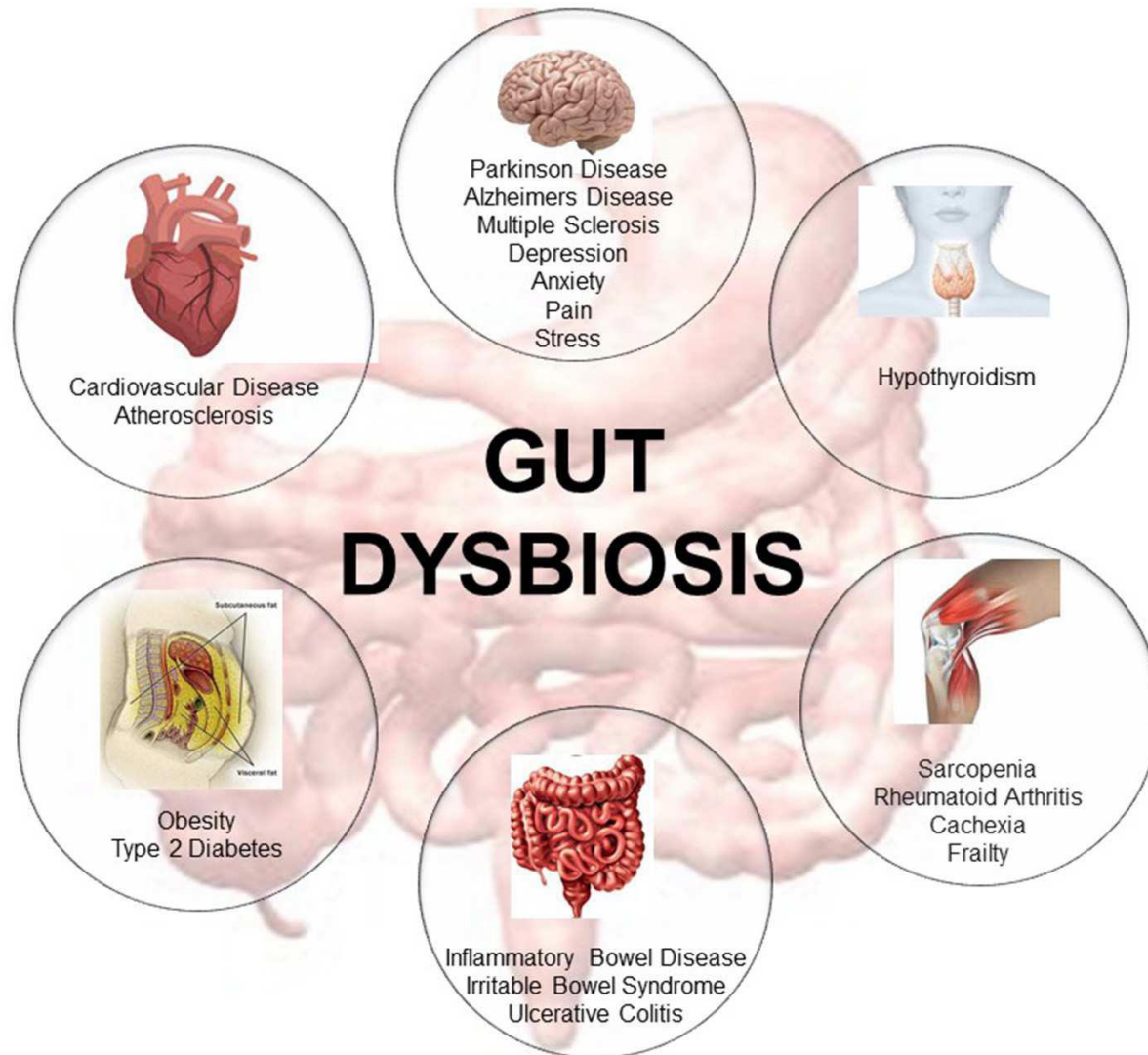
Foods to Include	Servings	Serving Size
<b>Vegetables Total</b>	5 or more times a day	
Of this, be sure to include: <b>Raw Leafy Greens</b> (e.g. lettuce, spinach, mixed greens, kale, cabbage)	1 time a day	1/2 cup except 1 cup for Raw Leafy Greens
<b>Cruciferous Vegetables</b> (e.g. broccoli, cauliflower, Brussels sprouts, kale, cabbage, bok choy)	3 times a week	
<b>Fruit Total</b>	4 or more times a day	1 medium fruit or 1/2 cup
Of this, be sure to include: <b>Berries</b> (fresh or frozen)	3 times a week	
<b>Unsalted Nuts or All-natural Nut Butters Total</b> (e.g. almond butter, peanut butter)	1 time a day	1/4 cup nuts or 2 tbsp nut butter
Of this, be sure to include: <b>Walnuts</b>	4 or more times a week	
<b>Beans or Legumes</b> (e.g. chickpeas, kidney beans, lentils, navy beans)	2 or more times a week	1/2 cup
<b>Fish or Seafood Total</b> (not battered or fried)	3 times a week	3-4oz
Of this, be sure to include: <b>Fatty fish</b> (e.g. salmon, trout, sardines)	1 or more times a week	

- Choose whole grains (e.g. oats, brown rice, brown pasta, 100% whole wheat or whole grain breads, quinoa, bulgur, barley, whole grain pasta) instead of refined grains (e.g. white rice, white pasta, white bread)
- Use low-fat milk (skim or 1%), yogurt (0-2%), and cheese (about 22%)
- Use extra-virgin olive oil as your main culinary oil for cooking, salad dressings, and added to bread and foods



Foods to Limit	Servings	Serving Size
<p><b>Any Meat and Poultry Total</b> No more than 1 meal per day should include meat or poultry</p>	1 or less per day	
<p>Of this, be sure to limit: <b>Red and processed meats</b> (e.g. beef, pork, lamb, liver, sausages, hot dogs, jerky, cold cuts, pepperoni )</p>	less than 1 per week	3-4 oz
<p><b>Butter, cream, or high fat dairy spreads</b> (e.g. sour cream, cream cheese)</p>	less than 1 per week	1 tsp butter 1 tbsp cream
<p><b>White breads</b> (e.g. bread, rolls, bagels, pita, tortilla)</p>	1 or less per week	1 slice bread 1/2 bagel
<p><b>Pre-packaged foods and meals</b> (e.g. canned soup, instant noodles, frozen appetizers, and entrees)</p> <p><b>Potato chips, fries, pretzels, or other salty snacks or fried food</b></p> <p><b>Store-bought dairy desserts</b> (e.g. ice cream, frozen yogurt, pudding, custard)</p> <p><b>Baked goods</b> (especially store bought) (e.g. cookies, muffins, scones, croissants, donuts, cakes, pies)</p> <p><b>Candy and chocolate</b></p> <p><b>Pop, sweetened fruit juice or any other sugary drink</b></p>		<p>3 or less servings per week in total for all these foods</p> <p>Serving sizes according to the Nutrition Facts table on the food label</p>

# Gut-brain axis



# Nutrition issues in cognitive impairment



- **Diet:**
  - provide a balanced diet with a variety of foods
  - ensure proper hydration
- **Facilitate mealtime:**
  - limit distractions
  - keep table setting simple
  - check food temperature
  - serve only one food at a time
  - respect food preference
  - cut food into small pieces
  - allow enough time to eat
  - make the meal a pleasant experience

<https://www.alz.org/help-support/caregiving/daily-care/food-eating>

# Nutrition issues in cognitive impairment



- **Encourage independence:**
  - make the most of a person's abilities
  - serve finger foods
  - neatness should not be an issue
- **Minimize eating and nutrition problems:**
  - ensure mouth and teeth are healthy
  - serve foods easy to chew and swallow
  - be alert to weight loss and signs of choking

(<https://www.alz.org/help-support/caregiving/daily-care/food-eating>)

## Ressources:

- Dietitians of Canada: <https://www.dietitians.ca/>
- Ordre professionnel des diététiste du Québec: <https://opdq.org/>

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