Nutrition and Brain Health

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Providing the world with innovations in aging
60% of Alzheimer’s diagnoses are attributed to lifestyle choices.

Poor eating habits and a lack of physical and intellectual stimulation are stronger drivers for dementia than genetics alone.

This means that we have real opportunities to make a difference.

Alzheimer Society of Canada; www.alzheimer.ca/
Reducing Risk for Dementia
The Brain Fitness Movement: Hope or Hype?

Goal:
- Build cognitive reserve
- Maintain reserve with aging
Brain Reserve Factors

- Being male
- Genetics
- Education
- Bilingualism
- Occupational complexity

- Physical health
- Mental health
- Diet
- Exercise
- Volunteering
- Cognitive engagement
- Social engagement
- Memory Strategies
Major Chronic Diseases That Have a Diet Connection

- Obesity
- Heart Disease
- Elevated Blood Cholesterol
- High Blood Pressure
- Type 2 Diabetes
Did You Know?

- These are all risk factors for:
  - Accelerated loss of cognitive function with aging
  - Dementia
The traditional high fat, low fibre, low fruit & vegetable North American diet is not good for our brains!
Also know that the health we bring in to our retirement is tremendously important


Its never too late to start
Engage your children!!
Brain Aging Occurs Throughout the Lifespan

Can The Glass Be Half Full?
What about the Mediterranean diet?

- Meta-analyses:
  In cognitively normal individuals, higher, vs. lower, adherence to the Mediterranean diet associated with a 27% lower risk for MCI and a 36% lower risk for AD (Singh et al, J Alzheimer Dis. 2013 Oct 28. [Epub ahead of print]).

- Scarmeas’ studies conducted in NYC, so have North American relevance.
Mediterranean Diet and Biologic Factors

Greater Adherence to Mediterranean diet associates with:

- Larger total brain volume (low meat eaters only)
  {Titova et al, Exp Gerontol., 2013. 48:1443-1448}

- Lower white matter hyperintensity volumes; especially with monounsaturated fat
  {Gardener et al, Arch Neurol, 2012. 69:251-256}

- Improvement in systemic markers for oxidation and inflammation
  {Konstantinidou et al, Mol Nutr Food Res, 2013. 57:772-783}
HOWEVER!!!

Eating a Mediterranean style diet does not mean concentrating on Italian, Greek or Spanish food – it refers to any diet rich in:

- Fruits
- Vegetables
- Whole grains and cereals
- Beans/pulses
- Fish

There are many ways to achieve a brain healthy diet
IS IT TOO LATE FOR ME?
Primary Prevention of Heart Disease With a Mediterranean Diet (PREDIMED)

- participants at high cardiovascular risk, but with no CVD at enrollment
- 7447 persons (aged 55 to 80 years) assigned to a low fat diet, Med diet with olive oil, or Med diet with nuts
- Trial stopped after median follow-up of 4.8 yrs

<table>
<thead>
<tr>
<th>Major Cardiovascular event&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Med Diet</th>
<th>Low Fat</th>
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<td>Hazard Ratio</td>
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<th>Med Diet</th>
<th>Low Fat</th>
<th>P</th>
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<tr>
<td>Hazard Ratio</td>
<td>0.61 (0.44–0.86)</td>
<td>1 (ref)</td>
<td>0.005</td>
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</table>

<sup>1</sup>Primary end point – adjusted model;
<sup>2</sup>Secondary end point

Impact of Mediterranean Diet on Cognitive Function (PREDIMED)

- Participants at high vascular risk
- 522 persons (age 74.6 ± 5.7 years) consuming low fat diet, Med diet with olive oil, or Med diet with nuts
- After 6.5 years of nutritional intervention

<table>
<thead>
<tr>
<th></th>
<th>Med + EVOO</th>
<th>Med + Nuts</th>
<th>Low Fat</th>
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</thead>
<tbody>
<tr>
<td>MMSE</td>
<td>28.00</td>
<td>27.96</td>
<td>27.40</td>
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<tr>
<td></td>
<td>(27.72 to 28.29)</td>
<td>(27.64 to 28.29)</td>
<td>(26.99 to 27.81)</td>
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<tr>
<td>CDT</td>
<td>5.45</td>
<td>5.27</td>
<td>4.95</td>
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<tr>
<td></td>
<td>(5.25 to 5.65)</td>
<td>(5.01 to 5.52)</td>
<td>(4.67 to 5.24)</td>
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</tbody>
</table>

Both Med diet different from low fat with adjusted analyses
No baseline measures

Martínez-Lapiscina et al, J Neurol Neurosurg Psychiatry 00:1–8, 2013
Diet and Brain Health

I'm not sure how long I can cope with this...

MISINFORMATION

FADISM

UNSUBSTANTIATED CLAIMS

FOOD OR NUTRIENT OF THE MONTH

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That A Single Nutrient Provides a ‘Quick Fix’ To A Complex Problem

Identify Bioactive Component of Food

Market Bioactive Component

Inform Public Health Policy

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Well, We Have A Problem

- NO successful clinical trials
  - Many have been tried
  - Antioxidants, folate and vit B$_{12}$, fish oils
  - All have failed (although evidence is getting stronger for fish oils)
How Are Research Findings Translated By The Public?

Purchasing

Local Availability
Is there evidence for ‘Super-foods’ and human brain health?

NO!!!

- Evidence at the food group level
- Variety is more important to ensure broad exposure to healthy nutrients and food components
- Exception is fatty fish (salmon, sardines, mackerel) or other sources of omega-3 fats
Of ‘foods to limit’ identified in Canada’s Food Guide (n=5669), 41% used nutrition related marketing

Examples of foods and beverages that are often high in calories, fat, sugar or salt (sodium) are:
- Cakes and pastries
- Cookies and granola bars
- Ice cream and frozen desserts
- Chocolate and candies
- Doughnuts and muffins
- French fries
- Nachos
- Potato chips
- Alcohol
- Fruit flavoured drinks
- Soft drinks
- Sports and energy drinks
- Sweetened hot or cold drinks

With permission Sacco and Tarasuk, 2012
We need to return to the simple message:

- Manage your cholesterol and blood pressure and reduce your diabetes risk
- Eat your fruits and veggies
- Choose whole grain alternatives and include more grains and beans/pulses in your diet
- Consume fish regularly
- Avoid highly processed foods and those with ‘empty calories’

Know that these practices will provide your brain with its needed nutrients to optimize function and protect against age-related insult.
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Depictions of a Healthy Diet

USDA

Canadian Plate Method
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THE BIG PICTURE
Lifestyle Characteristics Cluster Together Within Individuals

- Generally, individuals who are more educated and more financially able to meet their needs are also more active, socially engaged and have a higher quality diet.

- While individuals who have one negative lifestyle characteristic (e.g. smoking) are more likely to have several
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Adverse Effects of a High Sodium Intake Dependent Upon Activity Level

![Graph showing the annual change in 3MS score with different sodium intake levels and activity levels.]

Adverse effect of poor sodium intakes even when we took into account blood pressure and use of blood pressure lowering medications

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LITTLE TRICKS THROUGHOUT THE DAY
Glucose and Cognition in Adults

Hall et al, 1989
Neuropsychologia: 27: 1129

Paragraph Recall

# Scoring Units Recalled

Placebo
Glucose

Young
(18-23 y)

Seniors
(58-77 y)

Hall et al, 1989
Neuropsychologia: 27: 1129
Paragraph Recall Following Breakfast Consumption in Seniors

<table>
<thead>
<tr>
<th></th>
<th>Number of Scoring Units Recalled (maximum of 25)</th>
</tr>
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<tbody>
<tr>
<td><strong>Females</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Placebo</strong></td>
<td>Immed. 9</td>
</tr>
<tr>
<td><strong>Breakfast</strong></td>
<td>Immed. 10</td>
</tr>
<tr>
<td><strong>Males</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Placebo</strong></td>
<td>Immed. 8</td>
</tr>
<tr>
<td><strong>Breakfast</strong></td>
<td>Immed. 7</td>
</tr>
</tbody>
</table>
Time of Day and Cognitive Function

Mae & Hasher, 1995
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Time of Day and Cognitive Performance in Senior Adults

Paragraph Recall After Carbohydrate Intake

![Graph showing the number of scoring units recalled at AM and PM for Placebo and Glucose treatments.](image)

![Graph showing the percentage change in performance from AM to PM for Placebo and Glucose treatments.](image)
There are Many Ways to Eat Healthily
Diet and Brain Health

As Long As We Don’t Do This:
NOW THAT WAS A MOUTHFUL!
Diet and Brain Health Resource
1. Provides current scientific evidence on diet and brain health
2. Talks about how to incorporate this evidence into your own diet
3. Gives tips on temporarily boosting your cognitive function and controlling your appetite
4. Teaches about purchasing, storing and preparing healthy foods
5. Gives over 100 delicious and current recipes drawing on these principles

Available in stores, on-line shopping (amazon.ca; chapters/indigo.ca. Search: Mindfull Greenwood) or as an e-book.