SUCCESSFUL AGING

Decreasing your risk for Alzheimer’s disease through diet

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Enhancing and preserving cognitive health through healthy eating:

The benefits of healthy eating, how diet can maintain our cognitive functioning as we age, and how food choices may decrease risk for Alzheimer’s disease.
Diet-Disease Link

- Obesity is the leading cause of mortality in the U.S.
- Approximately 50% of cardiovascular disease could be prevented through diet and physical activity
- Estimated that blood pressure could be reduced on average by 25% among hypertensive patients through diet
- Cancer rates are estimated to be 30% lower in those with healthy diets
- There is growing epidemiological evidence that increased body fat increases risk for neurodegenerative diseases, including Alzheimer’s disease
Regions showing age-related decreases in gray matter volume (ages 55 to 89)
## Body Mass Index (BMI) and Brain Aging

<table>
<thead>
<tr>
<th>81 female participants</th>
<th>Normal</th>
<th>Overweight</th>
<th>Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants:</td>
<td>41</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>Age (M/SD):</td>
<td>72.4 (10.3)</td>
<td>70.4 (6.7)</td>
<td>66.8 (9.0)</td>
</tr>
<tr>
<td>BMI (M/Range):</td>
<td>22.0 (18 – 24)</td>
<td>27.4 (25 – 29)</td>
<td>35.3 (30 - 48)</td>
</tr>
<tr>
<td>Vocabulary:</td>
<td>69.5 (5.6)</td>
<td>70.0 (5.4)</td>
<td>67.8 (6.9)</td>
</tr>
</tbody>
</table>

Walther et al., & Ryan, 2008 *Human Brain Mapping*
Regions of gray matter show volume decreases as BMI increases, beyond the normal effect of aging.
Brain volume predicts memory

Frontal lobe volume vs. Memory scores (standardized)
Are anti-inflammatory (AI) drugs protective in older adults?

- Epidemiological studies on arthritis patients have shown consistent decreases in risk for Alzheimer’s disease
  
  - McGeer et al. (1990) Expected AD in 7490 cases of rheumatoid arthritis: 382 individuals
  
  - AD diagnoses in 7490 cases: 29 individuals
  
- Arthritis patients may show better preservation of brain function and structure, because of the possible protective effect of AI medications
  
- We expected that AI drug users would show less age-related decline in brain volume
Protective effects of anti-inflammatory medication

- Female chronic arthritis patients (N=36) using AI drugs consistently > 2 yrs (range 4-40 yrs)
- Female matched controls (N=33)

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Age</th>
<th>Educ</th>
<th>Vocab</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>36</td>
<td>66 (53-92)</td>
<td>14.9 (12-20)</td>
<td>66.4 (5.7)</td>
</tr>
<tr>
<td>Control</td>
<td>33</td>
<td>69 (52-88)</td>
<td>14.6 (12-20)</td>
<td>66.7 (6.6)</td>
</tr>
</tbody>
</table>

Walther & Ryan, 2009, *Neurobiology of Aging*
Regions showing age-related decreases in gray matter volume

Controls show more extensive age-related gray matter volume loss compared to anti-inflammatory drug users.
Regions showing age-related decreases in white matter volume

Controls also show more extensive white matter volume loss with age compared to anti-inflammatory drug users.
Controlling inflammation through food choices

- AI medications (ibuprofen, naproxen, etc) can have life-threatening side effects (gastrointestinal bleeding)
- Can diet provide similar benefits as drugs?
- Caloric restriction (30-40% reduction in calories)
- Lower total fat, increased omega-3 fatty acids, moderate alcohol, vitamin E, vitamin C, vitamin B12, St. John’s wort, selenium, flavonoids, etc.
- Conflicting evidence for individual supplements, sometimes actually detrimental (e.g., high dose vitamin E)
Resveratrol

- A plant-based polyphenol
- In dark red/purple plants
- Apples
- Blueberries
- Blackberries
- Acai berries
- Red grapes
Resveratrol

- Antioxidant, anti-inflammatory
- In animal models, shown to protect against cardiovascular injury, hypertension, and type 2 diabetes
- Specifically shown to protect against vascular damage in aged rodents and primates
- Also delayed the onset of age-related changes in spatial memory in these species
- What about humans? We don’t know yet…..
Caffeine – A drug that just keeps getting better
That cup of coffee.... Good or bad?

- What does it do? Increases levels of brain activity in regions that regulate attention and arousal.
- Coffee bean also includes chlorogenic acid (antioxidant) which improves glucose metabolism and increases fat metabolism.
- Benefits of moderate lifetime use include:
  - Decreased risk for Parkinson’s disease
  - Decreased risk for Alzheimer’s disease
  - Decreased risk for diabetes
  - Decreased risk for several forms of cancer
- What about a simple cup of coffee, particularly when you’re tired?
Caffeine and Memory

- Memory testing for older adults in the morning (optimal) compared to the afternoon (non-optimal).
- Half of participants were given a cup of decaf coffee and half given caffeinated coffee.
- Tested for memory 30 mins after the cup of coffee.
The Mediterranean Diet

- High in vegetables, legumes, fruit, whole grains
- High in unsaturated fatty acids (mostly olive oil)
- Low in saturated fatty acids
- Moderately high in fish
- Moderately high dairy products (mostly hard cheeses, yogurt)
- Low in meat and poultry
- Regular but moderate use of alcohol, primarily wine taken with meals
Benefits of Med Diet

- Associated with lower risk for cardiovascular disease, lower cancer risk, and overall lower mortality
- Recent study from Columbia University (Scarmeas et al., 2012) followed 2,258 people for over 10 years
- Measured adherence to a Mediterranean diet:
  - Fish, fruits, vegetables, legumes, cereals (high)
  - Ratio of mono-unsaturated to saturated fats (high)
  - Meats, dairy (low)
- Tracked the number of participants who developed Alzheimer’s disease over ten years
Participants without Alzheimer’s after ten years

- Lowest Med Diet group: 50% without AD
- Moderate Med Diet group: 62% without AD
- Highest Med Diet group: 74% without AD
- No individual component of the diet was predictive
Is Diet the Answer?

- Promising – resveratrol, caffeine, eating “mediterranean”
- But, it’s too soon to say for sure
- What’s the best strategy now?
- Maintain a healthy weight, make healthy food choices
- Why not? Eat as they do in Greece....
Top Behaviors for Healthy Weight

- Read the labels
- Write down what you eat
- Weigh yourself regularly
- Walk daily
- Set goals
- Work with others
- Control portions
Then

3-inch diameter
140 calories

Now

5-6 inch diameter
350+ calories
Then

1 cup pasta with 3 small meatballs
500 calories

Now

2 cups pasta with 3 large meatballs
1,025 calories
Then

6 ounces
85 calories

Now

20-64 ounces
280 – 900+ calories
What does healthy eating look like?
Eating “by the rainbow”

<table>
<thead>
<tr>
<th>Phytochemical</th>
<th>Health Claims</th>
<th>Food Source</th>
</tr>
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<tbody>
<tr>
<td>Carotenoids: alpha-carotene, beta-carotene, lutein, lycopene, zeaxanthin, etc.</td>
<td>Diets with foods rich in these phytochemicals may reduce the risk of cardiovascular disease, certain cancers (e.g., prostate), and age-related eye diseases (cataracts, macular degeneration).</td>
<td>Red, orange, and deep-green vegetables and fruits such as carrots, cantaloupe, sweet potatoes, apricots, kale, spinach, pumpkin, and tomatoes</td>
</tr>
<tr>
<td>Flavonoids: flavones, flavonols (e.g., quercetin), catechins (e.g., epigallocatechin gallate or EGCG), anthocyanidins, isoflavonoids, etc.</td>
<td>Diets with foods rich in these phytochemicals are associated with lower risk of cardiovascular disease and cancer, possibly because of reduced inflammation, blood clotting, and blood pressure, and increased detoxification of carcinogens or reduction in replication of cancerous cells.</td>
<td>Berries, black and green tea, chocolate, purple grapes and juice, citrus fruits, olives, soybeans and soy products (soy milk, tofu, soy flour, textured vegetable protein), flaxseed, whole wheat</td>
</tr>
<tr>
<td>Phenolic acids: ellagic acid, ferulic acid, caffeic acid, curcumin, etc.</td>
<td>Similar benefits as flavonoids.</td>
<td>Coffee beans, fruits (apples, pears, berries, grapes, oranges, prunes, strawberries), potatoes, mustard, oats, soy</td>
</tr>
</tbody>
</table>
Anti-inflammatory foods

- Vegetables and fruits (colorful)
- Oily fish (Alaskan cod, salmon, sardines)
- Nuts and Seeds (particularly almonds)
- Beans and legumes
- Mushrooms
- Spices – garlic, turmeric, cinnamon
- Teas and coffee
- Dark chocolate
- Red wine
Protein “more essential” as we age

- Women’s Health Initiative study found that current recommendation for 0.36 grams protein/pound body weight likely insufficient to prevent frailty in older adults
- Suggests increase to 0.5 grams/pound

- High quality proteins:
  - Whey
  - Egg whites
  - Fish/Lean meats
Exercise Benefits Everything

- Heart
- Muscle & Bone
- Immune Function
- Brain!

Howe et al., 2011; Lanza et al., 2008; Miller et al., 2012; Mann et al., 2012
National Institute on Aging at NIH: http://go4life.nia.nih.gov
My prescription for a perfect day

- A good cup of coffee to start your day,
- followed by a hike on Mt. Lemmon,
- a dinner of grilled salmon and salad with olive oil,
- and don’t forget the glass of wine....
Thank You Supporters...