SUCCESSFUL AGING

Decreasing your risk for Alzheimer’s disease through diet

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Topic

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

81 female participants

<table>
<thead>
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<th></th>
<th>Normal</th>
<th>Overweight</th>
<th>Obese</th>
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<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>
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<tr>
<td>BMI (M/Range):</td>
<td>22.0 (18 – 24)</td>
<td>27.4 (25 – 29)</td>
<td>35.3 (30 – 48)</td>
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<tr>
<td>Vocabulary:</td>
<td>69.5 (5.6)</td>
<td>70.0 (5.4)</td>
<td>67.8 (6.9)</td>
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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

Oxidative Stress & Inflammation

- Gender
- Obesity
- Aging
- Infections
- Tobacco
- Alcohol
- Menopause
- Aging
- Tobacco
- Alcohol
- Menopause
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>
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<th>N</th>
<th>Age</th>
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<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>
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<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

![Bar graph showing memory recall comparison between Decaf and Caffeine in the morning and afternoon.](chart.png)
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

![Bar chart showing 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         Now

**3-inch diameter**
140 calories

**5-6 inch diameter**
350+ calories

Then

Now

1 cup pasta with 3 small meatballs
500 calories

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?
### 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!
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...