

**Extra Slides for Science-Based Memory Preservation Nutrition talks**  
Extra Science and Practice Slides not covered in a 1 hour presentation; Prepared March 28, 2022






**Nancy B. Emerson Lombardo, Ph.D.**  
Adj. Asst. Prof. of Neurology/Boston University School of Medicine, Alzheimer's Disease Center  
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1

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Contact:  
[nemerson@brainwellness.com](mailto:nemerson@brainwellness.com)  
[nemerson@bu.edu](mailto:nemerson@bu.edu)  
978-621-1926




2

**More Details for MPN – selected slides also go to see website**

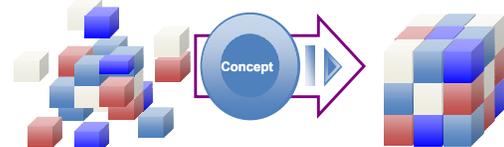
- Click on links to previous presentations on the MPN e.g. for patients and families at MGH...home page
- Download ppt pdf for ppt with details of foods and strategies for the MPN
- Download a different ppt regarding implementing brain healthy nutrition in congregate settings...adult day health or assisted living, or convent.
- Recipes using the MPN
- Other handouts or articles about MPN or other brain healthy lifestyles



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3

**Development of Memory Preservation Nutrition®**



Scientific evidenced-based research demonstrating a correlation between nutrition and cognitive health.

Memory Preservation Nutrition® (2005+)



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4

**Spice Up Your Life To Power Up Your Brain: Mechanisms**

- All herbs and spices
  - Potent anti-oxidants
  - Mildly to strongly anti-inflammatory
  - Positive impact on blood sugar, cholesterol
  - All fight microbes!!! (Ginger is anti-viral)
- Potent anti-inflammatory agents
  - Hot peppers, turmeric, ginger, oregano, rosemary, aloe vera and many others
- Those with high ORAC values likely reduce excessive levels of beta-amyloid
- Cinnamon
  - Blocks A-beta excess and oligomerization (mice)
  - Lowers cholesterol and blood sugar (RCT humans)
  - Improves neuroplasticity & structural integrity of hippocampus cells (Marie Pasinski MD)





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**Hot Peppers Spice Up Your Life!**

- The hotter the pepper, the more anti-inflammatory!
  - (cool the flames within) (but does aggravate GERD)
- Hot Chili Peppers also may extend life (see study previewed Nov. 2020 – Cleveland Clinic in Ohio)
- Hot Chili Peppers reduced all cause mortality by 25% and reduced death by cancer (23%) and heart (26%)
  - This was a medical record review of over ½ million people in US, Italy, China & Iran. (thus is “association” study- does not prove “cause.”)
- Anti-inflammatory action thought to be the key along with high anti-oxidant content. capsaicin is the “heat” and additional flavonols in hot peppers help too.



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6

### #1 Anti-Oxidants: Herbs & Spices More

**Many herbs and spices**

- Help boost immune system,
- Improve blood flow & blood pressure

**Sage, Lemon Balm & Saffron** each improved cognition in small pilot randomized clinical trials in early AD

*20 mg saffron tied 10 mg Aricept with no side effects*

**Flavor foods without salt, fat, & sugar**

**Kill or fight microbes:** viruses, bacteria and fungi

**Natural preservatives**




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### #2 Excess Added Sugar and Refined Carbs:

- Spikes our blood sugar\*
- Causes insulin resistance\*
- Increases inflammation\*
- Aggravates joint pain
- Increases triglycerides
- Increases weight & obesity cases
- Increases incidence of diabetes
- Increases risk of heart disease/doubles heart attack rate
- Tooth decay and gingivitis
- Increases small, dense LDL particles
- Lowers HDL

\* citation: AJCN 2008




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### Black/purple Rice Rich in Antioxidants



- So rich in nutrients and so delicious it was once "forbidden" to everyone except the Emperor!
- Mild nutty flavor, a bit chewy, quicker to cook than brown rice.
- As many anti-oxidants as blueberries-rich in anthocyanins, flavonoids & carotenoids.
- Richer in protein, fiber and anti-oxidants than white rice, thus lower glycemic index.
- Thus safe for people with diabetes as well as great for brain health.

100 g dry	protein	fiber	iron	Carbs	Calories
Black rice	8.9 g	2.2 g	2.4 mg	75.6	356
Brown rice	7.1	2.4	3.4	76.2	357
White rice*	6.7	0	3.2	77.8	333

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### 70% Dark Chocolate

1-1.6 oz./day has many benefits

- Lowers Inflammation
- Lowers blood pressure
- Lowers LDL
- Controls blood sugar
- Fights cell damage
- Improves thinking



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### MPN™ DEVILED EGGS=BRAIN FOOD – Omega 3 Eggs Help Lower Cholesterol



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### #4 HEALTHY FATS for BRAIN & BODY

BRAIN BASICS-We All are "Fatheads"

- 60% of our brain is comprised of fats &
- Which fats and proportions of various fats, matters
- Fat is critical and essential to brain and overall body health
- Fats make up part of every cell membrane in our body, especially in our brain.

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### #4 Mono-Unsaturated Fats-Healthy

Foods- mostly plant based

- Olive Oil & Olives
- Canola Oil
- Almonds & other nuts
- Peanuts
- 100% Natural Peanut Butter
- Avocados
- Most Seeds



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13

### "Beans and Greens" great prebiotics!

- Add some fermented foods as part of same meal e.g. a few of your favorite pickles or olives, which are also "pickles!"
- Or add a bit of vinegar to your beans and greens mixture if you crave "sour". Balsamic vinegar if you like a richer, slightly sweet type of flavor
- Or even mustard! (not a fermented product but lots of people like the taste)
- And for more anti-inflammatory power: hot pepper flakes



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### #7. Gut Health is Key – Eat Pre-biotics +

- **RESISTANT STARCHES** (r.s.): starches that are, or become, indigestible or slowly digestible...and thus pass through to large intestine and help feed probiotics.
- High in Naturally resistant starches: raw bananas (green twice as much!), rolled oats, green peas, white beans &
- Whole grains. Sorgham, whole wheat, quinoa, others
- **Processing destroys resistant starches.** Whole wheat is 14% resistant starch, milled white flour is only 2% r.s.
- More modest amounts in lentils, pearly barley, oatmeal and cold potatoes or pasta
- Cooked, then cooled, starchy foods can be higher in r.s. than when served hot: e.g. potatoes and pasta



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15

### MPN™ Successfully Implemented

Senior Living Residences of Massachusetts in 6+ assisted living communities – partial & ongoing over a decade!



Amazing Place Day Program in Houston, Texas -95-100%

Sisters of Charity - Houston, Texas

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16

### People with early AD Want to Eat Healthy: Survey Results from 50 ADH Participants Texas (November, 2013)

Item	Number Responding	% Yes	% So-so / Maybe	% No	% Other
Say Eating Healthy is Important/Very Impt	49	93%	--	4%	2%
Enjoying Helping Decide New Foods	48	68%	21%	10%	
Fewer Red Meats/More Seafood?	47	52%	33%	15%	
More Vegetables Than Meat?	48	42%	17%	37%	4%
Beans/Lentils Good for You?	47	81%	13%	6%	
Eat Too Many Sweets Here?	48	12.5%	--	87.5%	
Love or Like Fruit as a Dessert?	48	85%	8%	6%	

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### Poor Diet Increases AD Risk & Decline Rate

- Japanese persons with AD and Vascular Dementia compared to well age-mates: (Otsuka 2002)
  - Ate too many calories
  - Too much sugar
  - Too many Omega-6's from animal foods
  - Deficient in Omega-3's, antioxidants, vegetables, fruits, vitamins C, E and the B vitamins ----i.e. not eating traditional Japanese foods
- Japan changed from traditional Japanese diet to Western diet & AD rates 1% in 1985, to 7% in 2008. (W Grant, Sept 2016)
- French study found that, in persons with AD, poor nutritional status was a risk factor for rapid cognitive decline (B Vellas/S Lauque, PJ Ousset - Toulouse, France)



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### HELFIGED Study Shows Positive Results For Depression And Stress

- Randomized 156 adults 18-65 and 85 completed 6 month study.
- Intervention: 3 months free healthy Med Diet style food\*, 3 months of biweekly Med Diet cooking classes and 6 months free fish oil (900 mg of DHA and 200 mg of EPA)
- Control: 3 months biweekly social support sessions
- Results: 45% reduction depressive symptoms in Med Diet group; 1.68 times better than reductions in control
- Improved diet proven by blood tests & food ?aires: treatment group ate more brain foods & fewer processed foods, unhealthy snacks, sweets, and red meat, and these changes continued in mo.4-6

\*olive oil, nuts, beans, canned fish, fresh vegetables and fruits

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19



### SMILES Study: Med Diet Helps Depression

SMILES study: 67 adults with moderate to severe depression and poor diets at baseline:

- Poor diet: too few vegetables, fruits, lean meats and inadequate fiber and too many sweets, processed meats, and salty snacks
- 82% already receiving meds or therapy or both as tx for depr
- RCT: 12 weeks each group received same number and length of sessions.
  - Dietary intervention group: 7 nutritional training on ModiMedDiet by clinical nutritionist
  - Social therapy group: social support sessions
- Results: 33% of dietary intervention group experienced remission of their depressive symptoms compared to 8% of social therapy group.

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### Nordic Diet As Used in FINGER Trial

- 3 Individual counseling sessions (w/ study nutritionist year 1)
  - tailoring of the participant’s daily diet
- 6 group sessions in Yr 1 & 1-3 in Yr 2).
  - information & support to facilitate change; include discussions and practical exercises, such as tools to assess one’s own dietary behavior (e.g., fat or fiber intake).
- Diet is based mainly on the Finnish Nutrition
  - 10–20% of daily energy (E%) from proteins, 25–35E% from fat ; 45–55E% from carbohydrates 25–35 g/day dietary fiber, <5 g/day salt, and <5E% from alcohol.
- Food & nutrient intake is assessed by FFQ & 3-day food records at baseline, 12 & 24 months.

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21



### Nordic Diet in FINGER Trial -2

- Specific Goals:
  - 25–35E% from HEALTHY fats
    - <10E% from saturated plus transfatty acids,
    - 10–20E% from monounsaturated fatty acids,
    - 5–10E% from polyunsaturated fatty acids
      - [including 2.5–3 g/day n-3 fatty acids],
  - 45–55E% from carbohydrates (<10E% refined sugar), 25–35 g/day dietary fiber.
- Recommendations:
  - High consumption of fruit and vegetables;
  - Whole grain in ALL cereal products;
  - Low-fat options in milk and meat products;
  - Sucrose intake <50 g/day;
  - Use vegetable margarine and rapeseed (canola) oil instead of butter
  - Fish: consume 2+/week – or daily fish oil supplement if not consuming enough fish
  - Vitamin D : 10–20 µg/day

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### How Do We Reverse Insulin Resistance & Block this path to dementia?

- **Appropriate nutrition is one key method**
- **Moderate reduction in weight and half-hour of walking each day cut incidence of diabetes IN HALF** for overweight subjects with mild glucose intolerance. (Finnish Diabetes Prevention Study Group, 2001; Large prevention trials in US, China
- **Other important lifestyles**

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### How Do We Reverse Insulin Resistance & Block this Path to Dementia? At Least 5 Lifestyles Common To Help Blood Sugar & Brain:

- Exercise- we are made to move!
- Sleep
- Decrease stress
- Decrease inflammation – thru Exercise & Nutrition
- Appropriate nutrition e.g. MPN, MIND, Nordic or Mediterranean & less sugar!
- Interactive effect with hypertension

Source: Suzanne Craft 2007  
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24



### HOW DO WE PREVENT OR REVERSE A Shrinking Hippocampus?

- Nutrition of course, by reducing insulin resistance, oxidative stress, inflammation and more.
- But the story is even more exciting.



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25



### Exercise HELPS US GROW NEW BRAIN CELLS.

- THE MORE WE EXERCISE, THE FASTER WE PRODUCE MORE BRAIN CELLS.
- WHICH AREA OF THE BRAIN IS AMONG MOST RESPONSIVE TO EXERCISE, GROWING MORE BRAIN CELLS?
- **THE HIPPOCAMPUS!**



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26



### Brain and Body: We are One

- Whatever hurts heart and blood vessels harms the brain.
- Problems with glucose metabolism also threaten the brain. Diabetes, “pre-diabetes” and insulin resistance all increase risk.
- The organ & disease silos are disintegrating.
- Increasingly similar clinical recommendations.
- Healthy lifestyle, especially nutrition & exercise, helps prevent and treat most human chronic diseases.
- Thus **Healthy Lifestyles are helpful to both persons with dementia and to their carers who are at risk of depression and illness.**

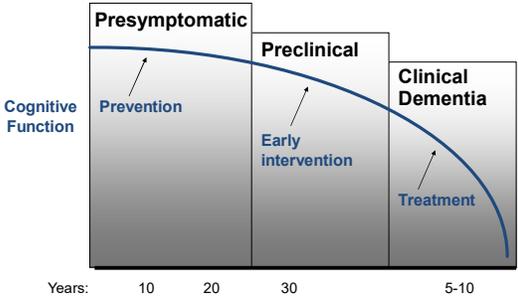


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27



### Alzheimer’s Disease Takes 2-3 Decades to Develop



The graph illustrates the progression of Alzheimer's disease over time. The y-axis represents 'Cognitive Function' and the x-axis represents 'Years' with markers at 10, 20, 30, and 5-10. The curve shows a steady decline from the 'Presymptomatic' stage (years 0-10) through the 'Preclinical' stage (years 10-30) to 'Clinical Dementia' (years 30-5-10). Key intervention points are marked: 'Prevention' in the Presymptomatic stage, 'Early intervention' in the Preclinical stage, and 'Treatment' in the Clinical Dementia stage.



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28



### Why Increased Interest in Public Health Lifestyle Approach for Brain Health?

- No drug on market other than blood pressure meds yet can slow risk, progression or prevent Alzheimer’s disease nor other major dementias. (Some drugs look promising)
- Evidence is building that lifestyle can do all this, though maybe not as dramatically as a potential “blockbuster” drug.
- Many countries cannot afford expensive new drugs should they be found. Brain+ Lifestyles help Body too.
- With 20-30 years to “develop” AD pathology.....will drugs ever be the only answer? Combination tx likely.



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29



### Remedy? Not a Pill or Surgery – Individual & Public Health Initiatives

- Restoration of good (& delicious) **nutrition** and **physical exercise** into our lives.
- Together with other healthy lifestyles to
  - decrease stress,
  - improve sleep,
  - balance energy,
  - **boost immune system,**
  - Decrease inflammation
  - increase social engagement,
  - Increase creative expression, &
  - improve community
  - While maintaining mental stimulation.



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30



### Protecting Brain Health through Lifestyle Intervention to Reduce

- **\$30 million+** investment see: <https://alz.org/us-pointer/overview.asp>
- 2-year intervention study to evaluate lifestyle “recipe”

 Physical Exercise	 Nutritional Counseling & Modification	 Cognitive & Social Stimulation	 Improved Self-Management of Health Status
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*supervised aerobic exercise*     *dietary counseling on adherence to the MIND diet (Mediterranean-DASH Intervention for Neurodegenerative Delay)*     *computer-based cognitive training and group counseling to facilitate increased cognitive/social engagement*     *increased medical monitoring and self-management of cardiovascular / metabolic conditions*

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**Does this prevent or delay cognitive decline?**

37

### Sleep Study added to US Pointer

- \$5.3 million grant from the [U.S. National Institute on Aging \(NIA\)](https://www.nia.nih.gov/) for the POINTER-zzz study to incorporate in-home sleep assessments in 700 participants enrolled in US POINTER study.
- Chronic sleep disturbances have been linked to an increased risk of cognitive decline and Alzheimer's disease.
- Scientific evidence suggests that diet, exercise and cardiometabolic risk reduction can improve sleep, and that improved sleep may benefit cognitive function in older adults.
- The POINTER-zzz study will examine whether lifestyle changes might improve sleep quality.
- Uses a simple test completed at home. The test involves wearing a watch-like device for one or more days and nights to measure sleep apnea, restlessness and other sleep disruptions.
- The results may show us how to reduce or treat sleep disturbances, which could slow or prevent cognitive decline.

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38

### Progress in Brain Health Nutrition Research

- Brain healthy lifestyles worldwide – **2000+**
- **Publication- Memory Preservation Diet (MPN) - 2005**
- In USA, research reaches public-importance of lifestyle in both prevention and treatment of AD-**since 2007**
- Europe has 3 major nutrition prevention trials, **2010+**
- First broad diet RCT clinical trial improves cognition-**2013**
- Alzheimer's Disease International releases Nutrition and Dementia report **2014**
- +FINNISH LIFESTYLE TRIAL includes **nutrition-July 2014**
- **AAIC 2015: Nutrition & Exercise Slows AD Pathology**
- **AAIC 2017- 2019 –World Wide Strategy** – replicate FINGER trial with regional variations and coordinate studies
- **Australian Mood Studies 2017** – Mediterranean Diet improves mood in just 3 months
- **2019:** Most major AD researchers & some physicians recommend nutrition and lifestyle as primary prevention available NOW

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39

### Organization & Commercial Efforts

- Alzheimer's organizations in many countries have redoubled their efforts in the lifestyle risk reduction arena. [https://www.alz.org/help-support/brain\\_health](https://www.alz.org/help-support/brain_health)
- ADI, Alz. Dis International, has long been interested and sponsored yet another symposium on Risk Reduction including Australia's on-line lifestyle intervention. <https://www.maintainyourbrain.org/>
- ADI invited AARP' Global Dementia Council to present a symposium. Responding to member's, AARP created programs on brain health emphasizing lifestyle. AARP **sells** a program called “Stay Sharp.”
- AARP partnered with various companies and countries on a free program called “Be Brain Powerful”

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One Website is <http://bebrainpowerful.org>

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40

### More Food for Thought: Possible Role for Microbes in Alzheimer's Risk and Progression

- Beta Amyloid or A-beta, is part of ancient immune system to protect the brain from microbial invaders (MGH)
- Production of beta-amyloid increases when foreign microbes are present and surround individual bacteria, viruses and perhaps other microbes, in order to neutralize their effects.
- This activity can lead to neuro-inflammation which may in turn get out of control, and lead to chronic problems, including excess A-beta, that help cause harm to the brain.
- Also may raise question of whether AD is an auto-immune disease. **Multiple pathways to AD?**

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41

### Update: Possible Role for Microbes in Alzheimer's Risk and Progression

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- This activity can lead to neuro-inflammation which may in turn get out of control, and lead to a chronic problem that helps cause harm to the brain.
- Raises question of whether AD is an auto-immune disease.
- **Multiple pathways to AD?**

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42



### Increased Brain Microbial Burden May Directly Exacerbate B-amyloid Deposition, Inflammation, & AD Progression

- Various microbes under study.
- Some Herpes viruses dormant in brain for decades may for unknown reasons activate or aggravate the inflammation/A beta/Tau aspects of Alzheimer's disease (Dudley et al Mt. Sinai researchers found Herpes viruses 6 & 7 common in brains of people with AD—these are common viruses causing roseola in children under 3. June 21 2018 Neuron)
- Tanzi, MGH show mechanisms in lab and animals-virus seeds A B deposition both HSV1 and Herpes 6a&b (Alzheimer's Disease-Associated  $\beta$ -Amyloid Is Rapidly Seeded by Herpesviridae to Protect against Brain Infection. Neuron Dec 2018 on-line July)
- Ruth Itzhaki "cold sore virus, i.e. herpes simplex virus 1 (HSV1), combined with certain genetic factor, account for 60% AD cases" & recommended Anti-viral treatment. (J or Pathology, 2009) Ignored and unfunded.

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43



### Possible Role of Bacteria

Other researchers are looking at resident bacteria dormant in the brain that under as yet unknown conditions can activate the same trio of AD components. (The antimicrobial protection hypothesis of Alzheimer's disease. Moir, Lathe & Tanzi)

- Oral bacteria which cause gingivitis are also under investigation.
  - Commercially funded study found evidence of gingivitis bacteria in brains of people with Alzheimer's disease. (1.23.2019 in *Science Advances*, *Porphyromonas gingivalis* in Alzheimer's disease brains: Evidence for disease causation and treatment with small-molecule inhibitors. S. Dominy (Cortexyme Inc)
  - An independent academic team found that repeatedly introducing gingivitis bacteria to wild-type lab mice resulted in oral infection that within a short time resulted in gingivitis bacteria in their brains, along with evidence of increase in beta amyloid and neurodegeneration. (Ilievski V, et al. (2018) Chronic oral application of a periodontal pathogen results in brain inflammation, neurodegeneration and amyloid beta production in wild type mice. PLoS ONE 13(10)
  - MGH group doubts that gingivitis is the solo cause of sporadic Alzheimer's, but suggests it might contribute to the etiology or worsening of the condition in some people.

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44



### Possible Role Dental Pathogens

- Several microbe types under investigation ranging from various herpes viruses to bacteria causing gum disease
- A review article in press with leading scientific journal Journal of Alzheimer's Disease concludes with this:
- "Evidence demonstrate that bacteria associated with periodontitis and their virulence factors are capable of inflecting damage to the BBB (blood brain barrier) and have a role in giving rise to pathology similar to that found in AD."
- SOURCE: Mhd Ammar Kouki, Anna Barlach Pritchard, Jane Elizabeth Alder, StJohn Crean Do Periodontal Pathogens or Associated Virulence Factors Have a Deleterious Effect on the Blood-Brain Barrier, Contributing to Alzheimer's Disease? JAD Vol. 85 no. 3. In Press

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45