



The Sigma
Series:
Science and
Technology
Series

October 6, 2015

Advancing the Prevention & Treatment of Alzheimer's Disease by 2025

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DISCLOSURES

- Dr. Welsh-Bohmer is the Neuropsychology Lead for a large 59 site global pharmaceutical company supported clinical trial to delay AD onset, the TOMMORROW study
- Contracts through Takeda and Zinfandel Pharmaceutical Companies

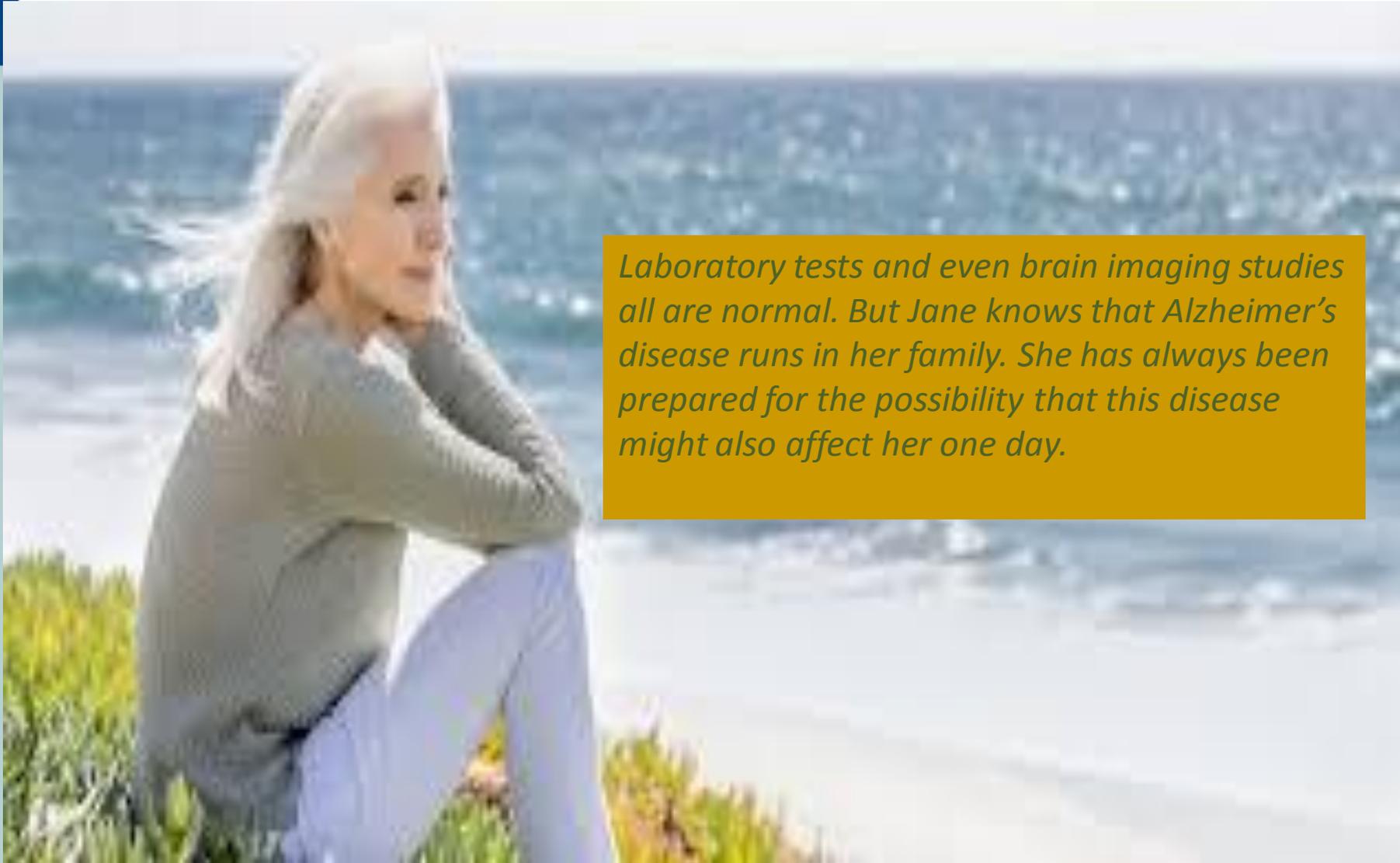
AD Center support through series of federal grants



Joseph & Kathleen Bryan Alzheimer's Disease Research Center (Bryan ADRC): P30 AG028377 P50 AG05128; Cache County Memory Study in Aging (CCMS): R01 AG11380U0; Aging and Dementia Study (ADAMS-HRS): AG09740 & AG027010



Here is Jane. Jane has been noticed some embarrassing problems with her memory for about a year now, ever since she retired and sold her business. She has difficulty tracking conversations and she is now more likely to repeat herself, unsure with whom she may have shared recent updates about her children and grandchildren.



Laboratory tests and even brain imaging studies all are normal. But Jane knows that Alzheimer's disease runs in her family. She has always been prepared for the possibility that this disease might also affect her one day.



Her family reassures her, pointing out how capable she is in all her activities. Her primary care doctor tells her that her concerns are normal and nothing more than age. Laboratory tests and even brain imaging studies all are normal.



Is that “one day” now here?

Do I have Alzheimer’s disease or is this just what I should expect with normal aging?

What can I do about it?



Alzheimer's disease (AD) is one of the most dreaded conditions, among the most feared diagnoses for adults over the age of 65

- Recent surveys indicate that 94% of physicians disclose diagnosis of terminal cancer
- Same group of physicians are reluctant to disclose the diagnosis of Alzheimer's disease to their patients

Blendon RJ. et al Key Findings from a Five-Country Survey of Public Attitudes about Alzheimer's Disease. Data from the Harvard School of Public Policy and Alzheimer's Europe study (2011)

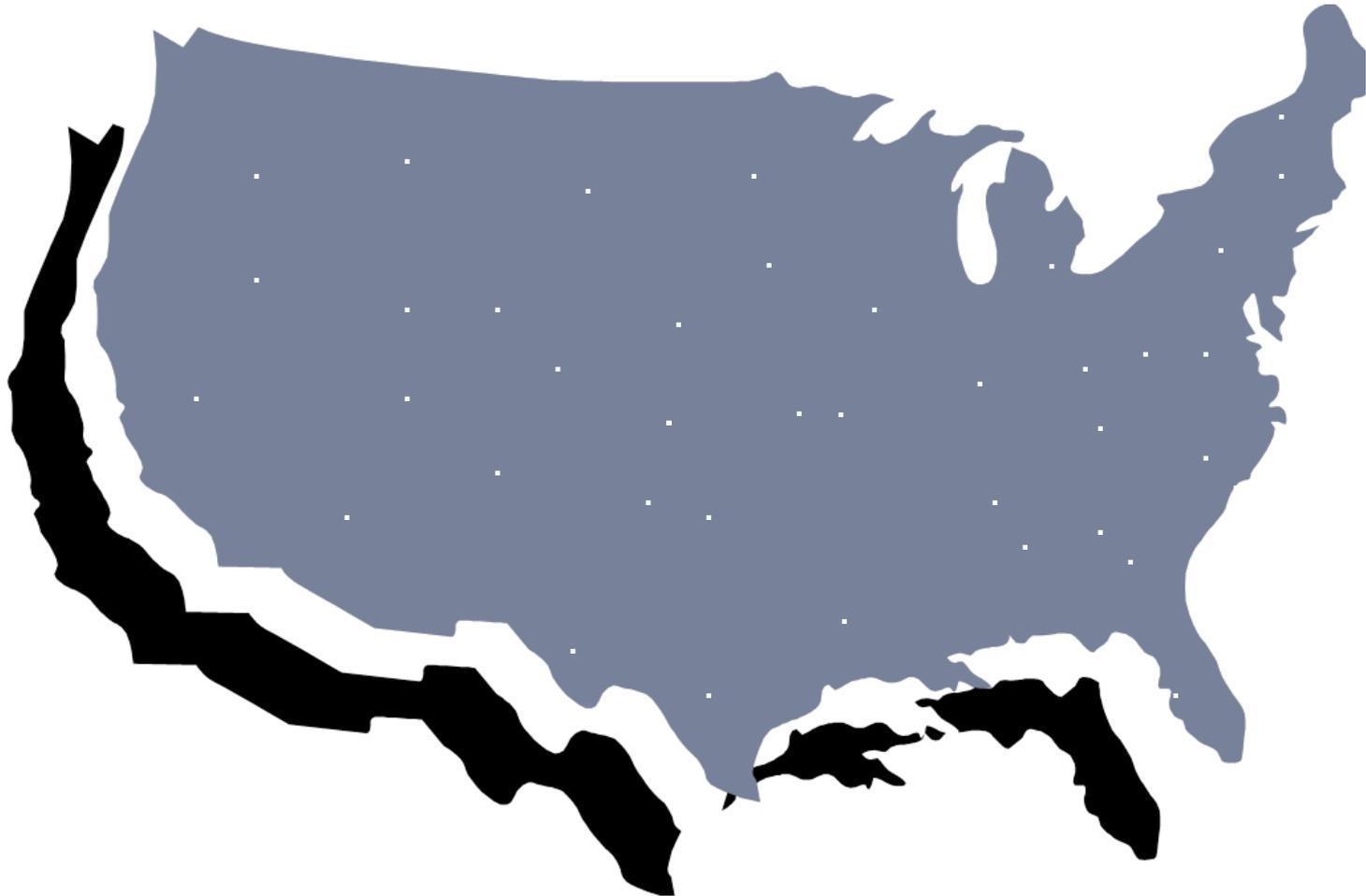


EVERY 70 SECONDS....

ANOTHER CASE OF ALZHEIMERS DISEASE IS DIAGNOSED



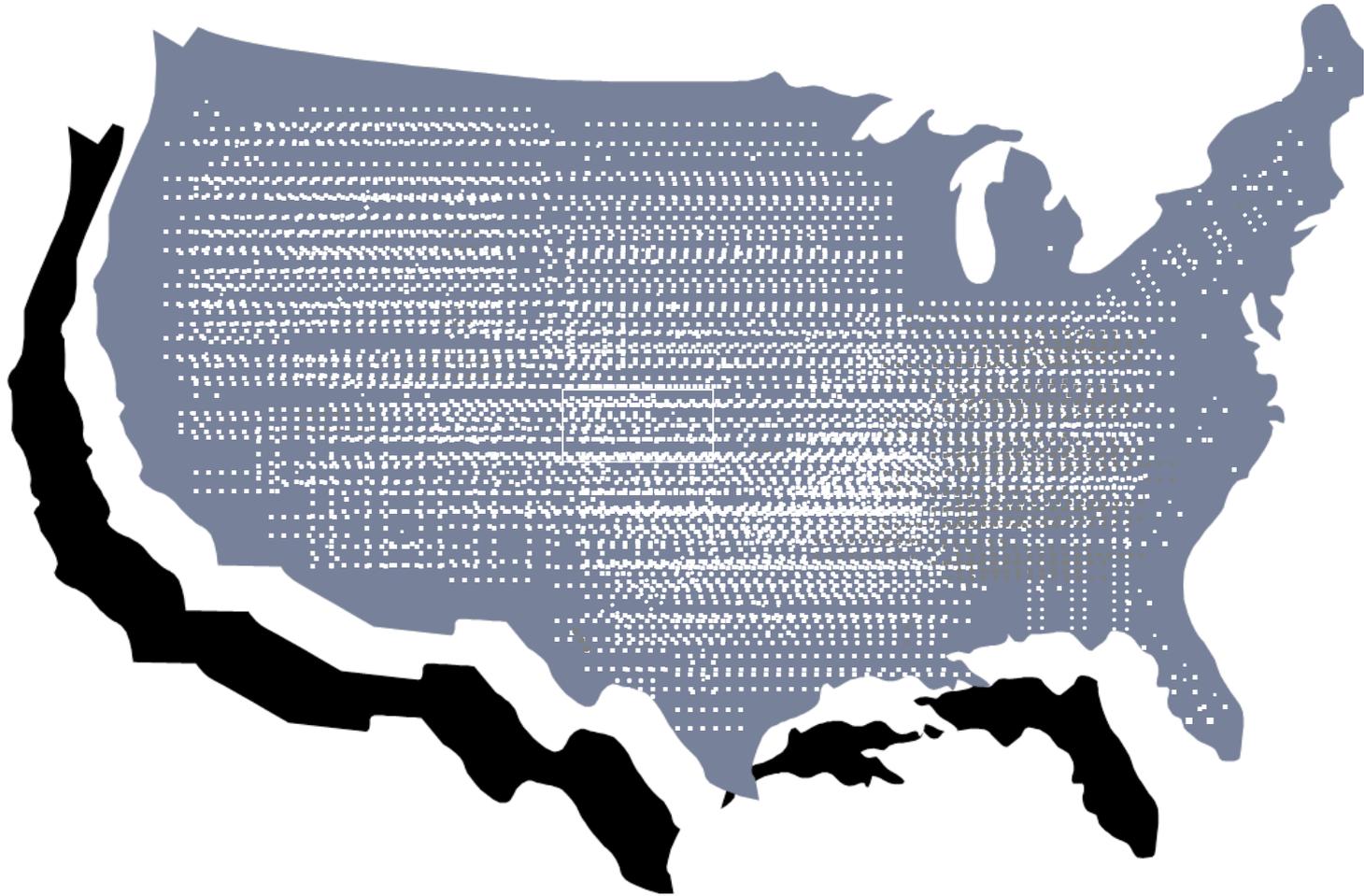
By the end of the discussion in one hour.....



50 new cases in this country will have been diagnosed



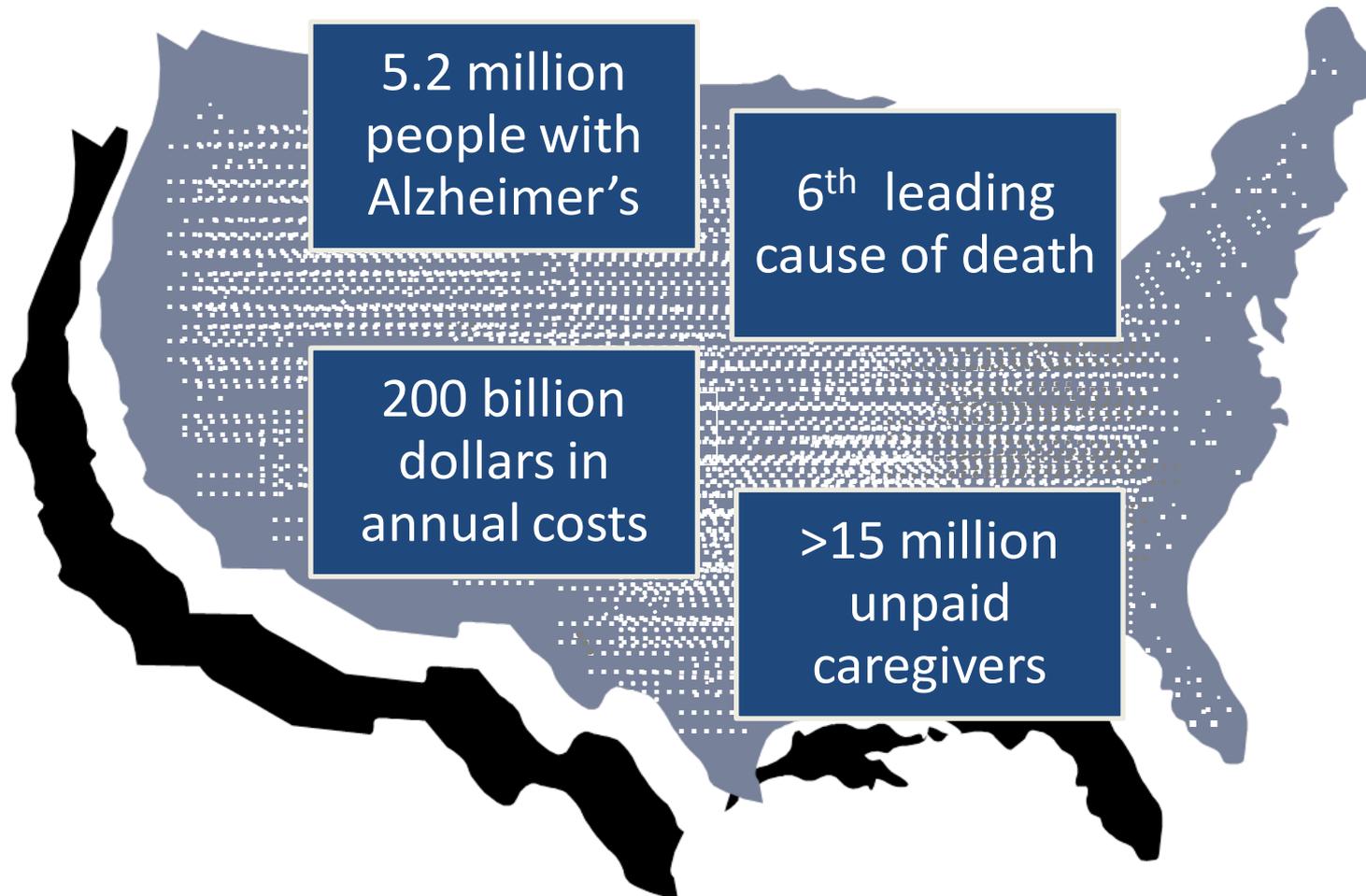
By the end of next week



There will be 4,800 new cases



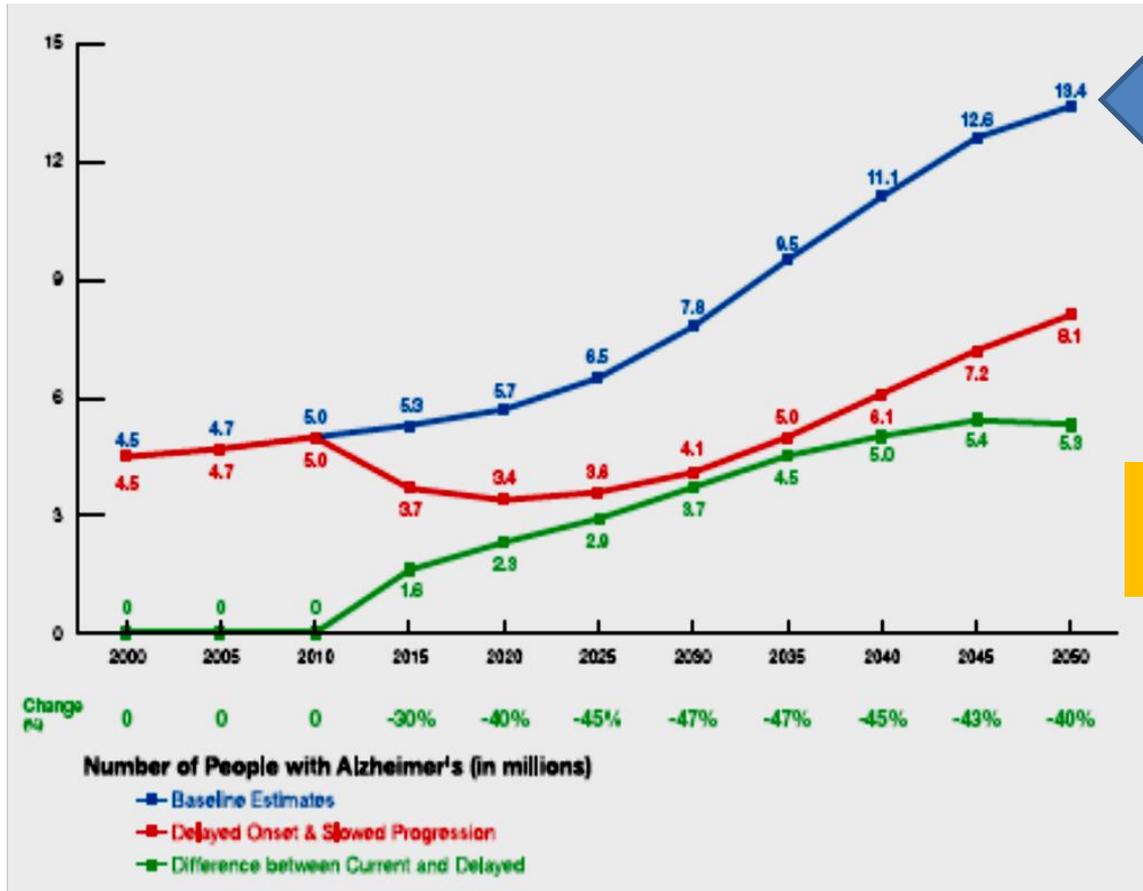
Currently.....





Without a cure....

Number of People with Alzheimer's Disease
Using Current Projections vs. Projections with Delayed Onset and Slowed
Progression



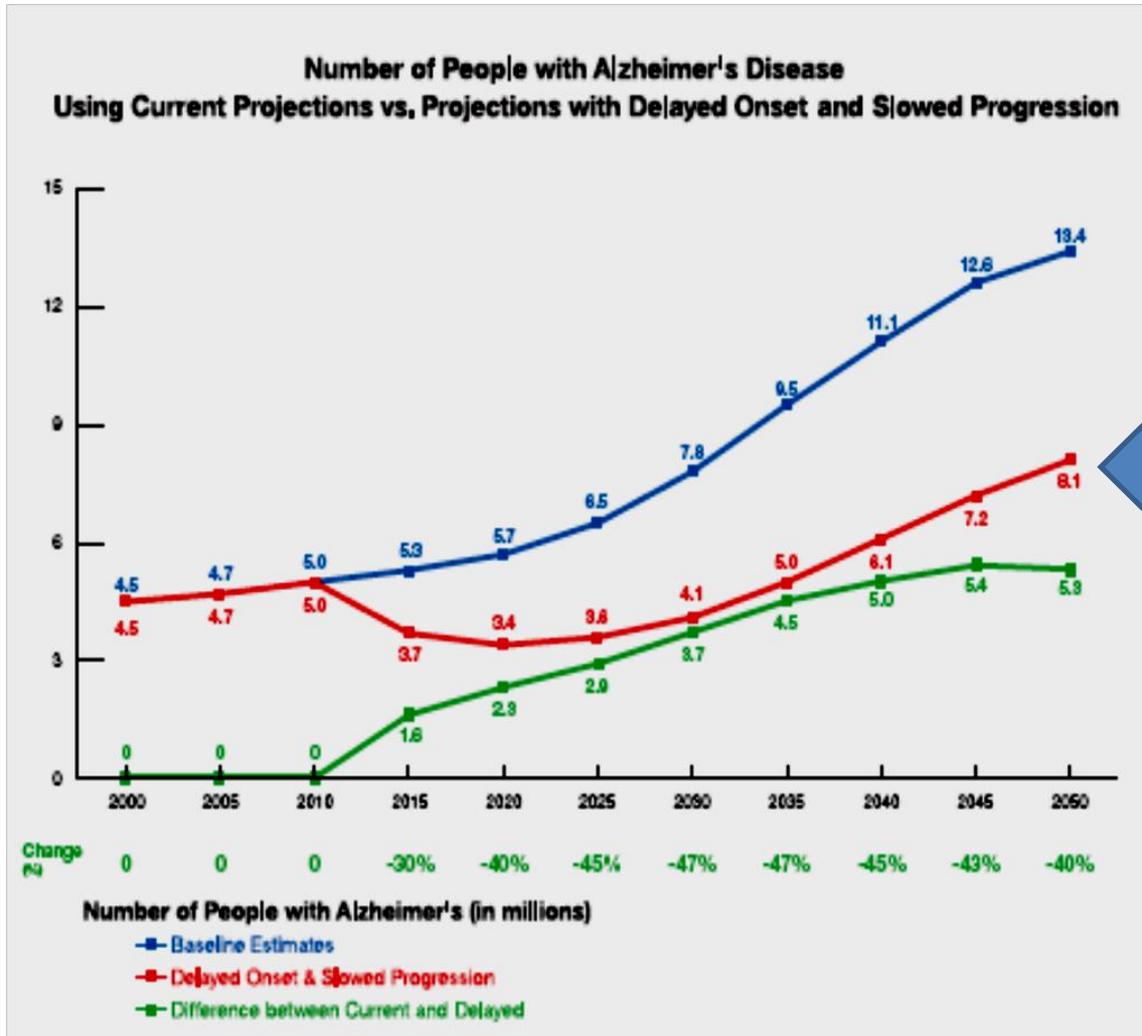
13.4 million +
Americans
affected by
2050

1.1 Trillion annually
(Alz Assoc, 2013)

(Rand Report 2013 NEJM; & Alz & Dementia 2013 9:208-45)



Delaying onset of dementia by 5 years....



8.1 million +
Americans
affected by
2050

5.3 million fewer
Americans

Net decrease of
40%

(Facts and Figures - Alz Association 2013)



Where we are today....

Bad News

- There is no treatment that will allow us to prevent the disease from occurring
- There is no treatment to stop the disease once it has started

Good news

Considerable progress in:

- **Scientific understanding of the biology of the disease**
- **Advances in technology, allowing earlier diagnosis and treatment possibilities**
- **Evidence based approaches for lowering risk and promoting healthy cognition**



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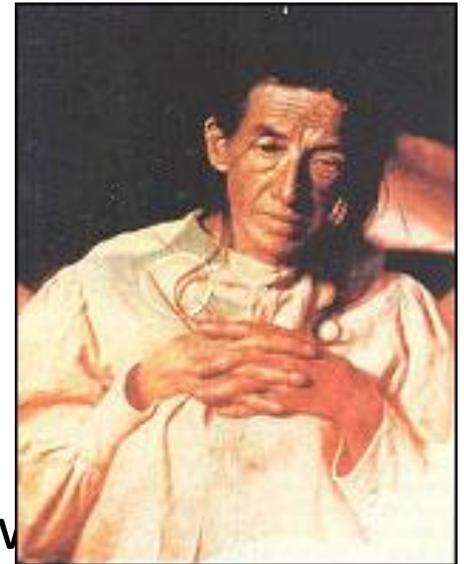
Alzheimer's disease \neq Aging

“Auguste D” - Alzheimer's Original Case

Admitted to Frankfurt Asylum Nov 26, 1901

- Mistrust of husband and female neighbor
- Mistakes in food preparation; neglected household; find way around apartment; hid objects, then could not find them
- Delusions of harm
- Memory deficits, perseverative, aphasic
- Agitated, screaming, strikes other patients

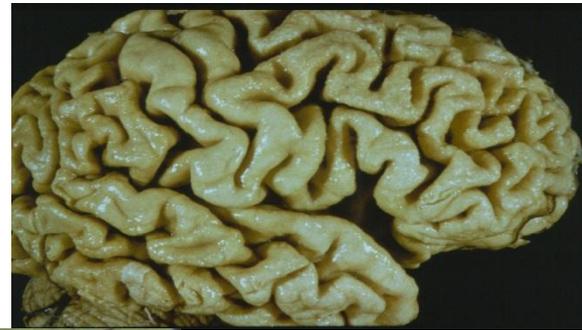
Died in April 1906; bedridden, decubitus, 74 lbs



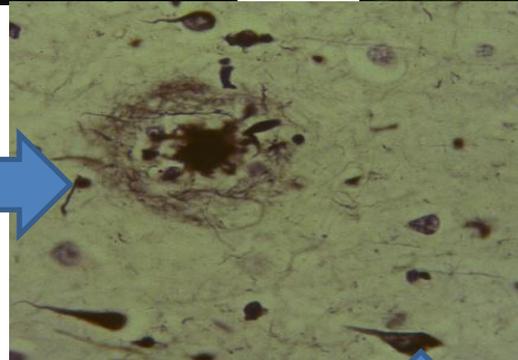


Alzheimer Disease:

Amyloid Plaques & Neurofibrillary Tangles



Beta amyloid
"plaques"



Atrophy

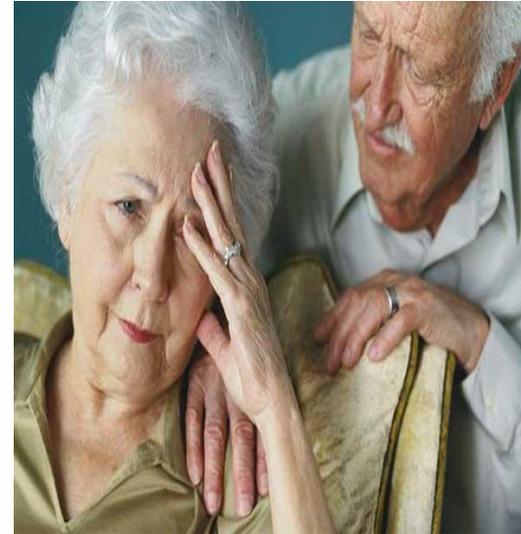


Neurofibrillary Tangles (*p-Tau protein*)



Alzheimer's Disease

- AD is common- affecting 10% over age 65
It is age-associated and becomes more prevalent with advancing age;
30-47% over age 85 have the illness
- Characteristic problem is different from normal age-related memory loss
Characterized by profound forgetfulness for recent events and it benefits very little from reminders
- *Gradual and inexorable*
Leads to functional disability & always fatal





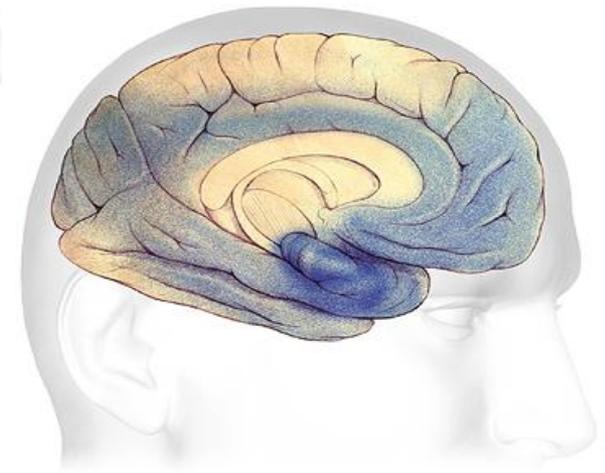
Tangles.... Under the Microscope



Mild Disease

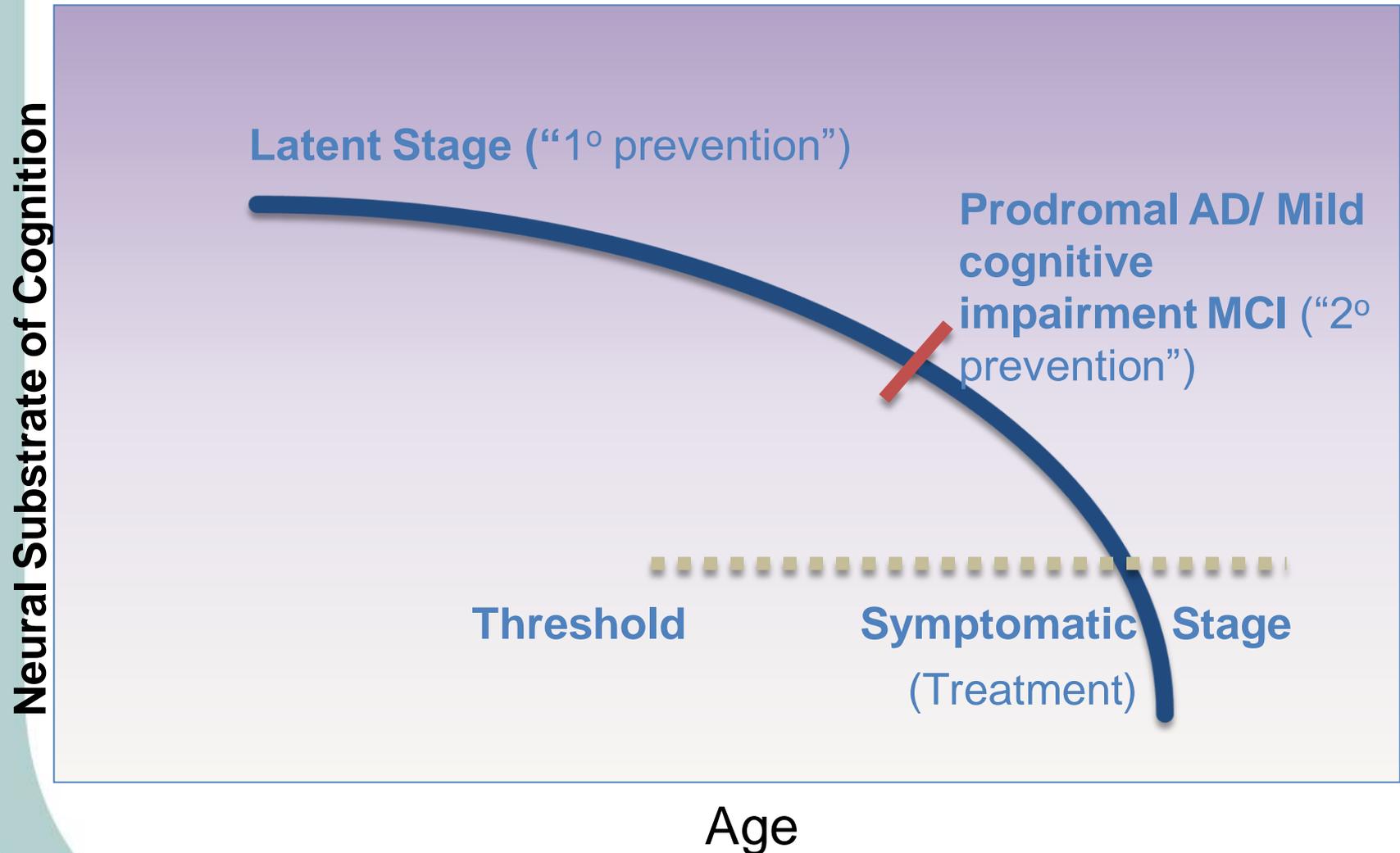


Moderate Disease



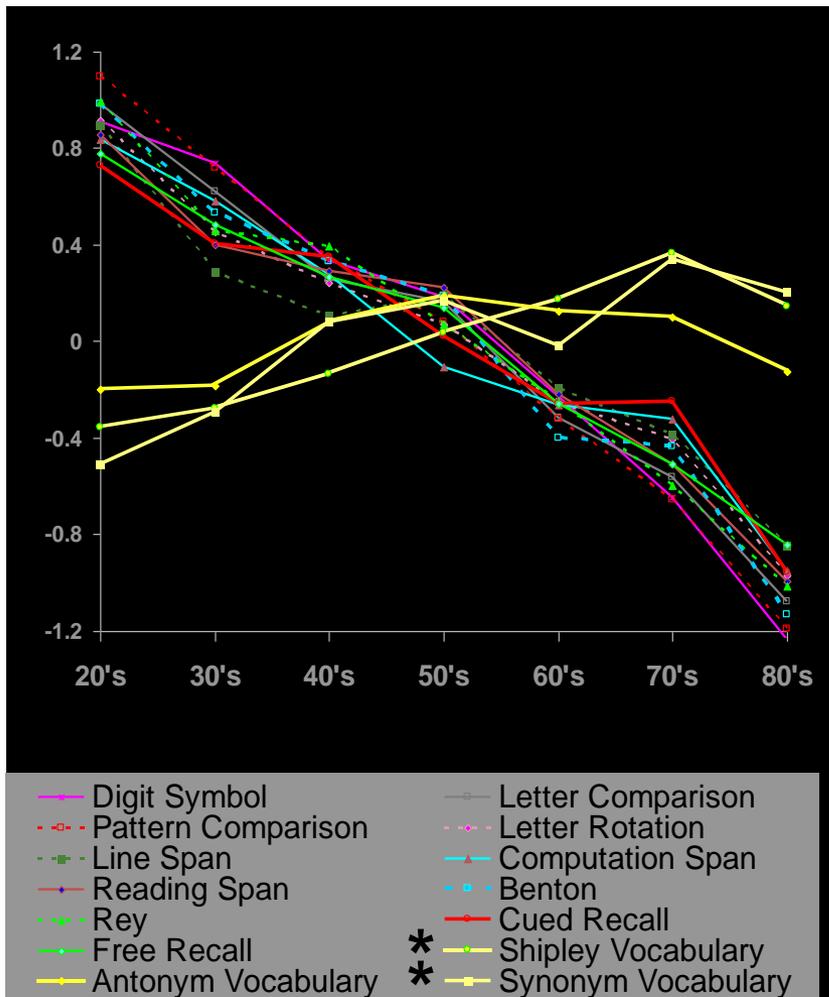
Severe Disease

Alzheimer's- Chronic disease (3 stages)





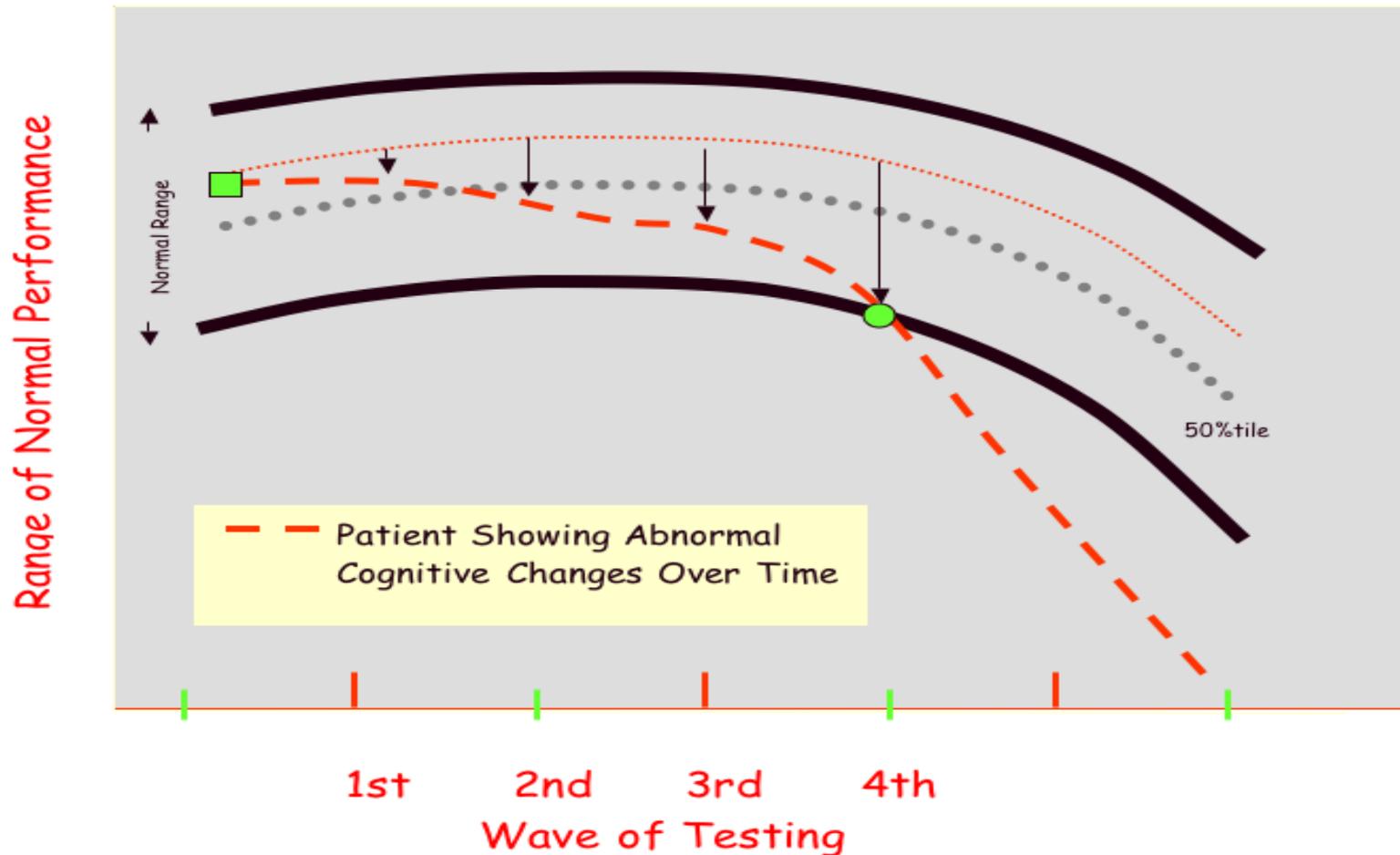
Normal Cognitive Aging



- Linear decline by age on measures of attention, concentration, rapid visuospatial analysis, episodic memory
- Resistant to age are aspects of decision making and abstraction based on lifetime of acquired knowledge



Memory Change in Aging \neq Memory Loss of AD

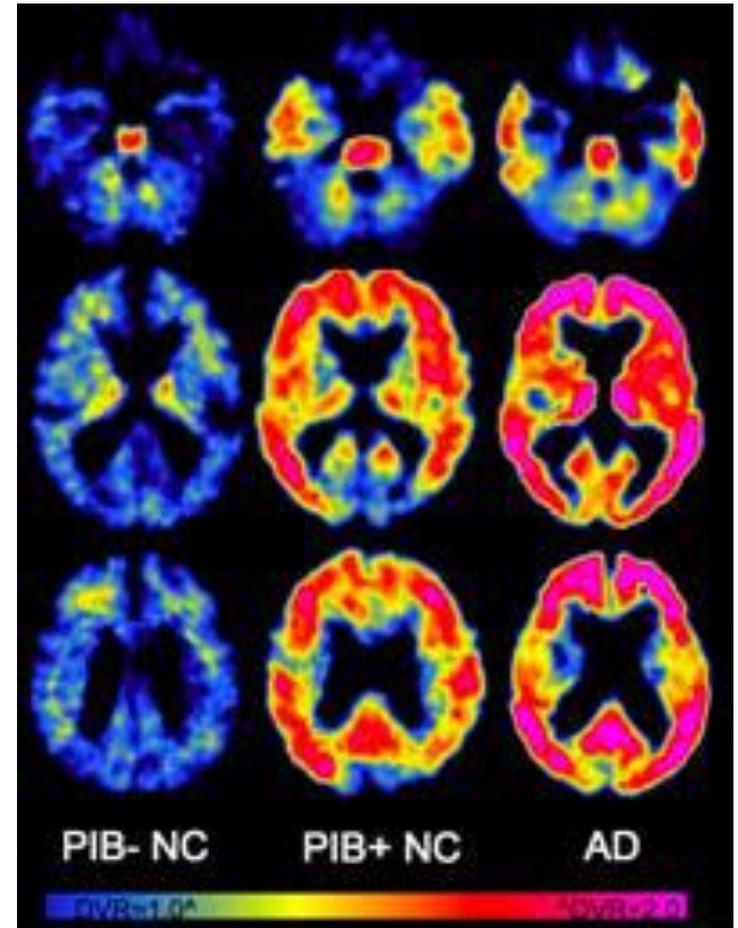




Biomarkers of Alzheimer's disease

International Working Group (Dubois 2007, Lancet Neurology)
NIA-Alzheimer's Association (Sperling 2011, Alz Dementia)

- Measure proteins abnormal in AD (amyloid and tau) in cerebrospinal fluid (CSF)
 - or –
- Use new imaging methods – Amyloid Brain imaging using Positron Emission Tomography (PET) imaging
 - Amyloid can be tagged with a radio-pharmaceutical (e.g. F18 florbetapir seen here) and can then be visualized on imaging with PET
 - Three different agents now FDA approved for detecting abnormal levels of brain amyloid.



Amyloid PET = CSF Biomarkers for early AD

Palmqvist et al (2015) Neurology ahead of print (September 9 2015)

Published Ahead of Print on September 9, 2015 as 10.1212/WNL.0000000000001991

Detailed comparison of amyloid PET and CSF biomarkers for identifying early Alzheimer disease

OPEN ▲

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For the Alzheimer's Disease Neuroimaging Initiative
Lennart Minthon, MD, PhD
Kaj Blennow, MD, PhD
Mattias Olsson, PhD
For the Swedish BioFINDER study group
Oskar Hansson, MD, PhD

ABSTRACT

Objective: To compare the diagnostic accuracy of CSF biomarkers and amyloid PET for diagnosing early-stage Alzheimer disease (AD).

Methods: From the prospective, longitudinal BioFINDER study, we included 122 healthy elderly and 34 patients with mild cognitive impairment who developed AD dementia within 3 years (MCI-AD). β -Amyloid ($A\beta$) deposition in 9 brain regions was examined with [18 F]-flutemetamol PET. CSF was analyzed with INNOTEST and EUROIMMUN ELISAs. The results were replicated in 146 controls and 64 patients with MCI-AD from the Alzheimer's Disease Neuroimaging Initiative study.

Results: The best CSF measures for identifying MCI-AD were $A\beta_{42}$ /total tau (t-tau) and $A\beta_{42}$ /hyperphosphorylated tau (p-tau) (area under the curve [AUC] 0.93-0.94). The best PET measures performed similarly (AUC 0.92-0.93; anterior cingulate, posterior cingulate/precuneus, and global neocortical uptake). CSF $A\beta_{42}$ /t-tau and $A\beta_{42}$ /p-tau performed better than CSF $A\beta_{42}$ and $A\beta_{42}$ /40 (AUC difference 0.03-0.12, $p < 0.05$). Using nonoptimized cutoffs, CSF $A\beta_{42}$ /t-tau had the highest accuracy of all CSF/PET biomarkers (sensitivity 97%, specificity 83%). The combination of CSF and PET was not better than using either biomarker separately.

Conclusions: Amyloid PET and CSF biomarkers can identify early AD with high accuracy. There were no differences between the best CSF and PET measures and no improvement when combining them. Regional PET measures were not better than assessing the global $A\beta$ deposition. The results were replicated in an independent cohort using another CSF assay and PET tracer. The choice between CSF and amyloid PET biomarkers for identifying early AD can be based on availability, costs, and doctor/patient preferences since both have equally high diagnostic accuracy.

Classification of evidence: This study provides Class III evidence that amyloid PET and CSF biomarkers identify early-stage AD equally accurately. *Neurology*® 2015;85:1-10

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- Examined the utility of amyloid PET imaging and CSF biomarkers in older adults (n=122) and MCI patients (n=34) who 3 years later develop AD dementia
 - Measures of $A\beta_{42}$ /total tau and $A\beta_{42}$ /p-tau had highest accuracy of the fluid biomarkers - Accurate 93-94%
 - Amyloid PET measures had similar level of accuracy – Accurate 92-93%
- No improvement by adding the two tests (imaging & CSF) together, suggesting they are equally accurate



Treating & Preventing Alzheimer's

What is utility of an early diagnosis?

Can we do anything to treat the disease?

Can we prevent progression?

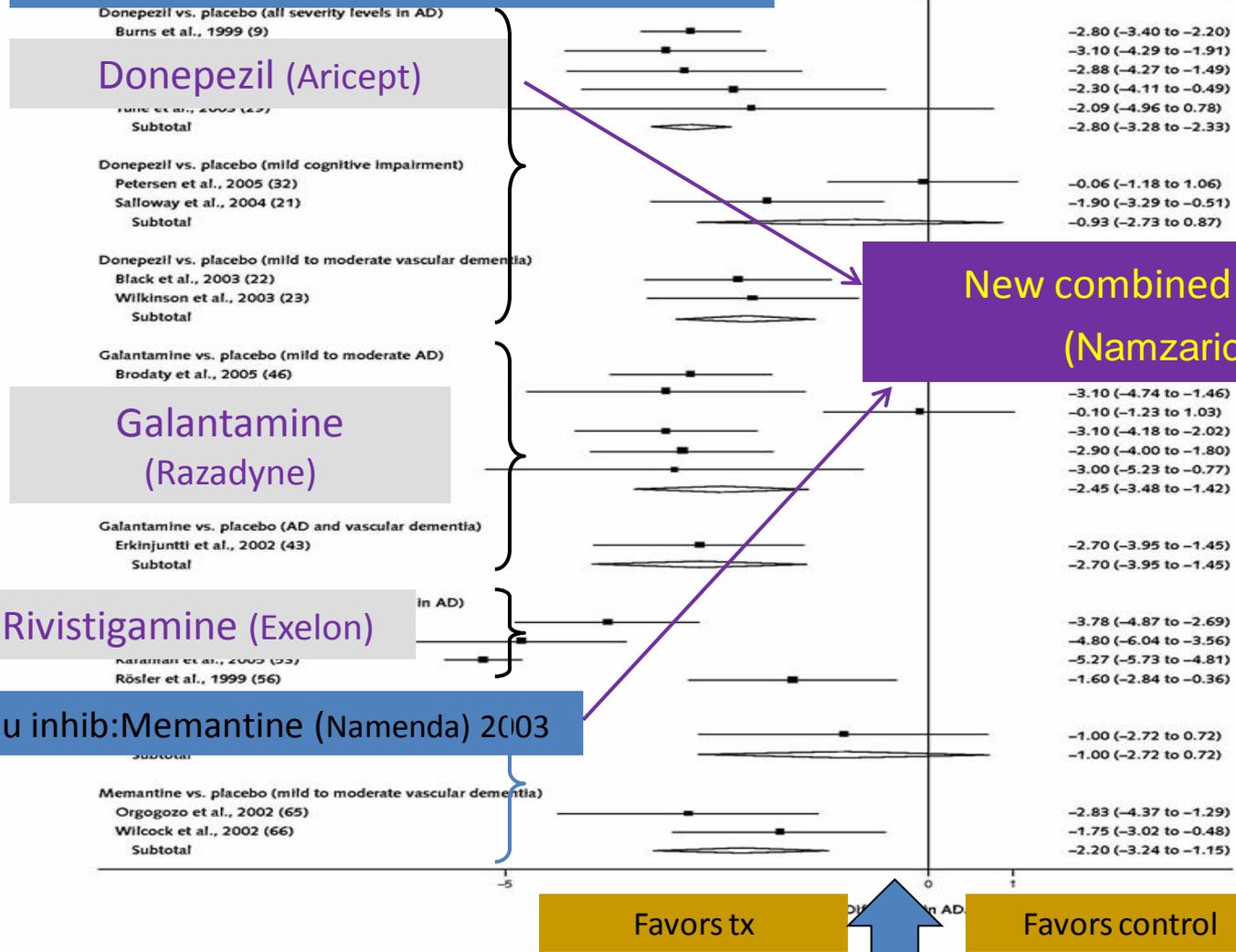


The two major treatment approaches:

- Symptomatic treatment
- Disease-modifying treatment

CURRENT FDA APPROVED DRUGS FOR AD & THEIR EFFECTS

Cholinesterase Inhibitors (1993-97)



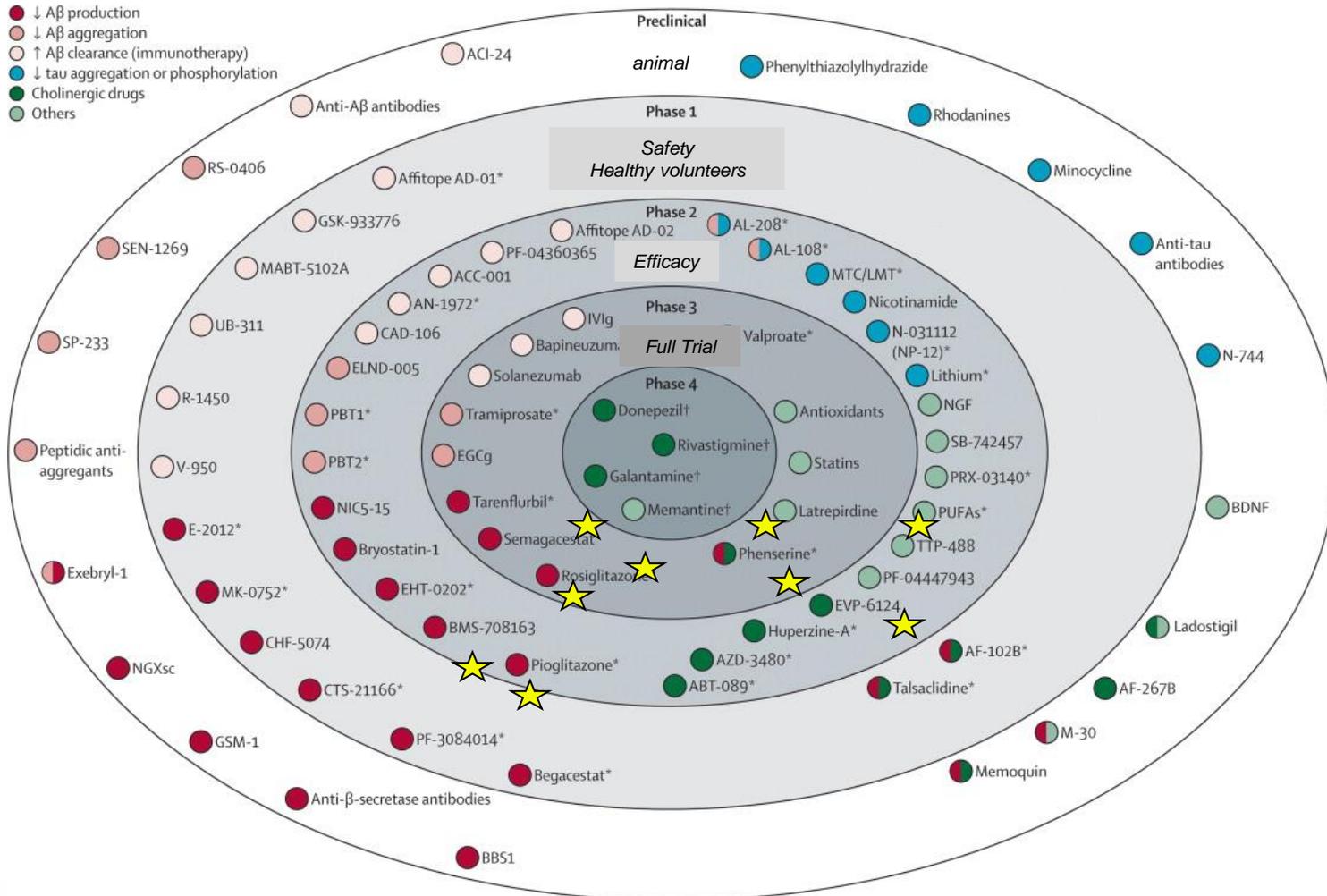
New combined treatment (Namzaric) - 2014

Glu inhib: Memantine (Namenda) 2003

For donepezil (10 mg/d) versus placebo (Alzheimer disease [AD], all severity levels), the estimate was statistically significant ($P < 0.001$) and tests for heterogeneity were not significant ($I^2 = 0.0\%$; $P = 0.94$). For donepezil (10 mg/d) versus placebo (mild cognitive impairment), the estimate was not significant ($P = 0.31$) and tests for heterogeneity were significant ($I^2 = 75.5\%$; $P = 0.043$). For donepezil (10 mg/d) versus placebo (mild to moderate vascular dementia), the estimate was significant ($P < 0.001$) and tests for heterogeneity were not significant ($I^2 = 0.0\%$; $P = 0.84$). For galantamine (24 mg) versus placebo (mild to moderate AD), the estimate was significant ($P < 0.001$) and tests for heterogeneity were significant ($I^2 = 75.5\%$; $P = 0.001$). For galantamine (24 mg) versus placebo (mild to moderate AD and vascular dementia), the estimate was significant ($P < 0.001$). For rivastigmine (6 mg and 12 mg) versus placebo (AD, all severity levels), the estimate was significant ($P < 0.001$) and tests for heterogeneity were significant ($I^2 = 90.8\%$; $P < 0.001$). For memantine (20 mg) versus placebo (mild to moderate AD), the estimate was not significant ($P = 0.25$). For memantine (20 mg) versus placebo (mild to moderate vascular dementia), the estimate was significant ($P < 0.001$) and tests for heterogeneity were not significant ($I^2 = 11.4\%$; $P = 0.29$).



AD Drugs in Development





National Alzheimer's Project Act (NAPA)



- January 4, 2011
 - Passed unanimously by both houses of Congress
 - Signed into law by President Obama
- Creates a national strategic plan to address & overcome the escalating crisis of Alzheimer's disease
- 2013 goal announced to develop treatments to slow progression and prevent onset of AD by 2025

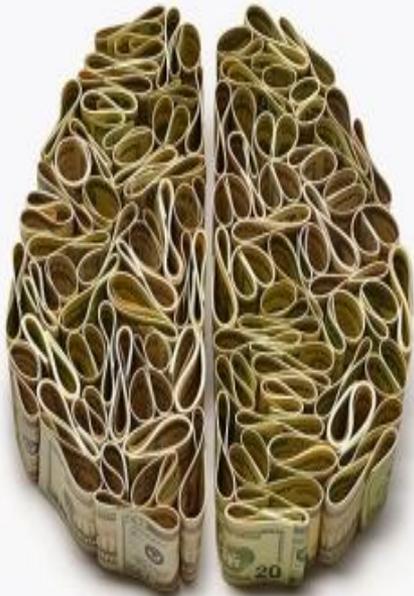


National Alzheimer's Project Act (NAPA)



- Congress added \$100 million in 2014 to the National Institute on Aging's portfolio for Alzheimer's research
- Doubled the \$100 million going to the so-called BRAIN initiative (**B**rain **R**esearch through **A**dvancing **I**nnovative **N**eurotechnologies) – important for new insights into treatment.

National Alzheimer's Project Act (NAPA)



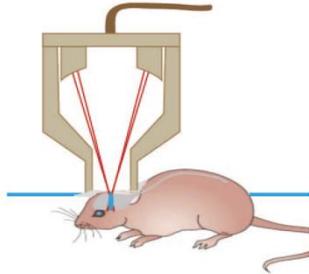
Where's the War on Alzheimer's? As research funding lags, cases are increasing — with staggering costs. T.R. Reid
(www.aarp.org/health/brain-health/info-2015/alzheimers-research.html)

- To fully meet the 2025 goal will require **\$2 billion** annually over the next decade in research funding
- 30 July 2015 - NIH requested an additional \$323 million in Alzheimer's disease funding over the \$737 million base appropriation. If approved:
 - \$36.5 development of new biomarkers and disease-monitoring technologies
 - \$92.8 million would go toward translational research and clinical interventions;
 - \$45.1 million to studying Alzheimer's disease epidemiology; and
 - \$9.8 million to improving how Alzheimer's disease patients are cared for, such as optimizing dosing regimens with existing drugs.
 - \$31 million would be used to improve resources for researchers including data and tissue repositories; and
 - \$35.4 million to help establish and support research partnerships between the public and private sectors
 - NIH to submit budget based on professional judgment 2017-2025 to reach milestones of national plan.



New Novel Approaches

Aiming at Key AD Targets



- Ultrasound treatments in transgenic mice to remove A β by allowing brief opening of blood-brain barrier

(Leinenga & Gotz, Science Transl Med, March 11 2015)

- Yale researchers repurposed a cancer drug (AZD053 Saracatinib) to prevent amyloid fibrils from attaching to neuron cell surface and memory improved on 3 different memory tasks in treated mice

(Kaufman et al 2015 Annals of Neurology)

Duke researchers were able to block an abnormal immune cell response in brain with a cancer drug (DMSO) and blocked brain plaques and memory problems in transgenic mice

(Colton et al 2015 J Neuroscience)



2015 Alzheimer's Disease Prevention Studies

- Dominantly Inherited Alzheimers Network (**DIAN**) Trial Unit (DIAN-TU; families with disease),
- Alzheimer's Prevention Initiative (**API**) examine compounds to prevent AD onset and cognitive decline in genetic forms of the disease (young age of onset)
 - Alzheimer's Disease Cooperative Study Anti-Amyloid Treatment in Asymptomatic AD (**ADCS- A4 Study**) will examine treatments in individuals who show increased amyloid accumulation in their brains on amyloid imaging studies
 - **TOMMORROW** Study examines individuals at high and low genetic risk (algorithm: age, APOE, TOMM40)



What can we do now????

- Seven things that can be done now to reduce risk of disease and
- Potentially have a positive impact on memory decline & dementia progression



Step 1: Change in Mindset



- Not all memory change is disease & many disorders have a treatable component
- Not powerless as we age & have responsibility to maintain health
 - Continued contributions (big or small) to the larger society, family, & friends
 - Older workers/volunteers bring the “Wisdom of age” and a life well-lived to the dynamic



Step 2: Treat what can be treated

- Stop smoking
- Reduce alcohol consumption
- Management of medical conditions :
 - Heart disease & vascular risk conditions
 - Hypertension, diabetes, high cholesterol
 - Thyroid disease
 - Sleep disorders
 - Pain, arthritis
 - Anxiety & depression





Step 3- Get Physically Active



Senior Guidelines For Physical Activity

Aerobic Exercise

(walking, jogging, dancing, biking, swimming, etc.)

Older adults need moderate-intensity aerobic physical activity for a minimum of 30 minutes five days each week or vigorous intensity aerobic activity for a minimum of 20 minutes three days a week. (Moderate intensity is when you feel "warm and slightly out of breath," and vigorous is when you feel "out of breath and sweaty.")

Resistance Exercise

(weight lifting, calisthenics)

Older adults will benefit from performing activities that maintain or increase muscular strength and endurance for a minimum of two days each week. It is recommended that eight to 10 exercises be performed on two or more nonconsecutive days per week using the major muscle groups.

Flexibility Exercise

To maintain the flexibility necessary for regular physical activity and daily life, older adults should perform activities that maintain or increase flexibility at least two days each week for at least 10 minutes each day.

Balance Exercise

To reduce risk of injury from falls, older adults with substantial risk of falls (for example, with frequent falls or mobility problems) should perform exercises that maintain or improve balance.



Exercise your Body

The Evidence:

- Experimental Studies:
 - Active adult mice have reduced cerebral accumulation of AB plaques and ROS
 - Exercise up-regulates proteins that stimulate neural growth in the hippocampus (learning and memory)



Best Test:

Randomized Exercise Trials

- Meta-analysis of aerobic exercise trials
 - Non-demented adults (MCI included)
 - Literature search of 5,538 articles
 - 29 randomized trials & 2,049 participants
- Aerobic exercise improves cognitive function
 - Attention and processing speed (g = 0.158, p = .003)
 - Executive function (g = 0.123, p = .018)
 - Memory (g = 0.128, p = .026)
 - Working Memory (g = 0.032, p = .642)
- Improvements larger among MCI
- Findings consistent across samples and training mode
 - Training: intensity, duration, combined with strength training

Smith, P.J. et al., (2010) Aerobic exercise and neurocognitive performance: A Meta-analysis of randomized controlled trials Psychosomatic Medicine 72: 72(3):239-52



Exercise & Reducing Risk of Alzheimer's

Lautenschlager et al (2008) JAMA 1027-1037.



- Normal adults with memory complaints (50 yrs+)(68.6 ± 8.7)
- 170 participants were randomized to 24 week exercise program (n=85) or usual care/ education program (n=85)
- Change in ADAS cog over 18 months
- Found modest improvement (usual care deteriorated 1.04 pts; Intervention improved 0.26 pts; Overall difference was 1.3 points)

Baker et al. 2010. Effects of Aerobic Exercise in MCI. Arch Neurol



Physical Activity- What to do

And what we tell our older patients.....



- Many of us are not athletes or not currently athletic
- Work up to a walk 15-20 minutes, 2-3 x week
- Mix it up! Walk, bike, swim, get outdoors, have fun
- Activity can take other forms: gardening, raking leaves, taking stairs whenever you can

Physical Activity- What to do

Go4Life.

Be active
4 ways
everyday!

*from the
National Institute on Aging at NIH*



- NIH Website to help you get started
www.nia.nih.gov/Go4Life
- 4 types of exercise
 - Aerobic (walking)
 - Strength (weights)
 - Flexibility (yoga)
 - Balance (tai chi)
- Physically activity is important – whether formal exercise or not
- Bottom line: find something you enjoy doing and make it a regular part of your routine



Physical Activity- What to do



- Before starting a new exercise regime.... consult your doctor
- Three questions to ask:
 - *Are there exercises I should avoid?*
 - *Is my preventative health up to date?*
 - *How do my health conditions affect my ability to exercise?*
- Your doctor can help you select activities that are right for you and reduce risk



Step 4: Watch what you eat!

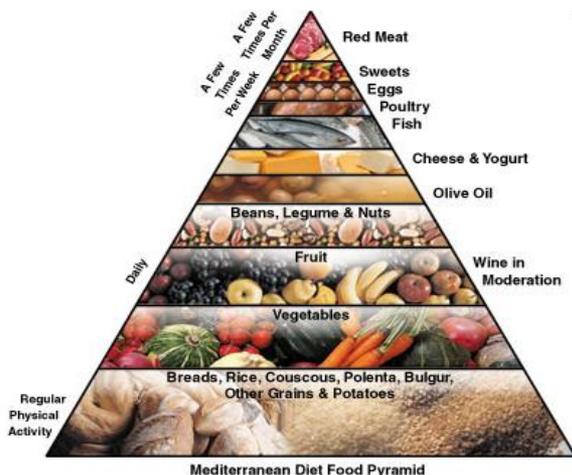


- Rationale:
 - Healthy diet offers protection from cardiovascular disease
 - Cardiovascular disease and obesity are associated with increased risk of strokes and Alzheimer's disease
 - Antioxidant intake from fruits and vegetables may protect against brain injury due to oxidative stress

Step 4: Watch what you eat!



DASH Diet



Mediterranean Diet Food Pyramid

- Our own work in Cache County¹ Utah points to the importance of a healthy dietary pattern rather than vitamin supplementation
 - Diets such as the **DASH diet** or the **Mediterranean diet**, both of which emphasize eating vegetables, fruits, whole grains, and lean sources of protein and dairy reduces risk of cognitive decline and AD
 - Recent multinational clinical trials² of 27,860 men and women indicate **healthy eating** (cardiovascular scale akin to Med Diet) and reduced risk of cognitive decline

¹Wengreen, H., et al. Prospective study of the DASH and Mediterranean style dietary patterns and age related cognitive change: the Cache County Study on Memory Health and Aging. Am J Clin Nutr, 2013. 98(5): p. 1263-71.

²Smyth, A., et al. Healthy eating and reduced risk of cognitive decline. A cohort from 40 countries. Neurology, 2015, 84: 2258-2265.



Diet & Nutrition: What to do



- NIH provides useful guides to diet and health
<http://nihseniorhealth.gov/>
- If you have a health condition, check with your doctor or a dietician for what foods to avoid
- Begin by making one change at a time
 - Limit sugar intake
 - Take salt shaker off the table
 - Switch to whole grain
 - Add fish to the diet

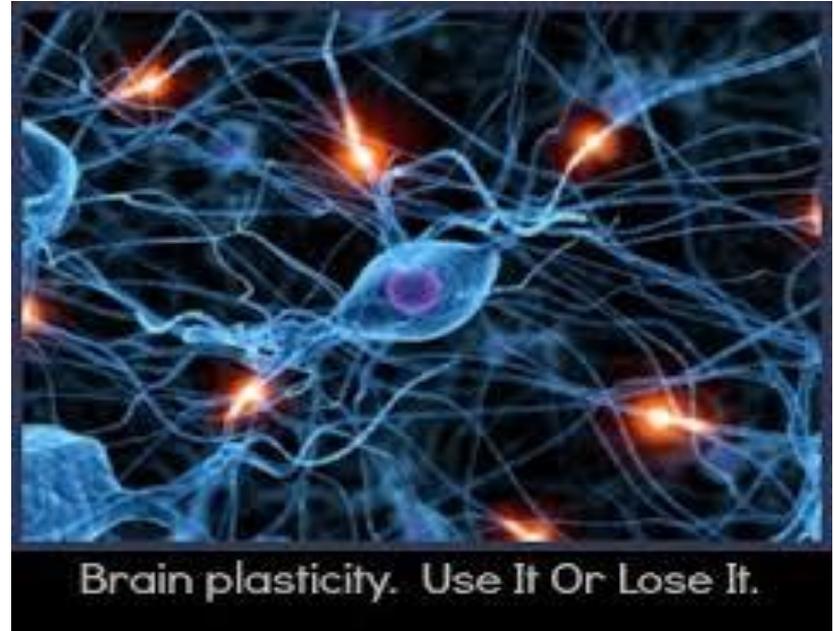


Step 5: Work your brain- engage it in novel ways



Cognitive Engagement: Evidence

- **Epidemiological evidence** suggest that engaging in cognitively stimulating activities-NOVEL activities (i.e. new way of thinking /challenging) in mid- and late-life is associated with better cognitive outcomes
- **Animal work** also shows increased synaptic plasticity when animals are housed in rich versus impoverished environments



- **Clinical trial:** ACTIVE study “*Advanced Cognitive Training for Independent and Vital Elderly*” Randomized control trial of 170 healthy participants. Persistent improvement in speed of processing 10 years later (Rebok et al., 2014 J Am Geriatric Society)



Cognitive Engagement: Evidence



- Clinical Trial
 - Newcastle on Tyne, NE England (n=30)
 - Assigned participants to 8 weeks of exercise, puzzles, or art class; 3 hours week
 - Physical health improved with exercise;
 - Puzzle performance improved with puzzles;
 - Art class led to highest level of satisfaction and sustained activity
 - Social engagement and challenging, novel activity with sense of mastery & accomplishment

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Brain Fitness- Computer gaming???



Small short-term effects particularly if done as group activity.....

Jury is out whether effective & currently no solid evidence that delay disease or effects of aging

- Lampit, A., Hallock H, Valenzuela, M. (2014). Computerized cognitive training in cognitively healthy adults: A systematic review and meta analysis of effect modifiers. *PLOS medicine*, 11: 1-17.
- Melby-Lervåg, M., & Hulme, C. (2013). Is working memory training effective? A meta-analytic review. *Developmental Psychology*, 49, 270-291.
- Noack, H., Lövdén, M., & Schmiedek, F. (2014). On the validity and generality of transfer effects in cognitive training research. *Psychological Research*. 78(6):773-89.
- Redick, T. S., Shipstead, Z., Harrison, T. L., Hicks, K. L., Fried, D. E., Hambrick, D. Z., . . . Engle, R. W. (2013). No evidence of intelligence improvement after working memory training: A randomized, placebo-controlled study. *Journal of Experimental Psychology: General*, 142(2), 359-379.
- Roig, M., Nordbrandt, S., Geertsen, S. S., & Nielsen, J. B. (2013). The effects of cardiovascular exercise on human memory: A review with meta-analysis. *Neuroscience and Biobehavioral Reviews*, 37, 1645–1666.
- Shipstead, Z., Redick, T. S., & Engle, R. W. (2012). Is working memory training effective? *Psychological Bulletin*, 138, 628-654.



Computer??? Games???



Asking right question...

- Some emerging evidence
....Trying **new** things &
challenging the brain is key
- Mayo Clinic Study of Aging³

- Artistic
- Social activities
- Computer use*

Begun in mid or *late life protect
against MCI

- among persons 85-89 followed
every 15 months for 3-6 years.

³Roberts et al (2015) Risk and protective factors for cognitive impairment in persons aged 85 years and older. *Neurology* 84: 1854-61.



Step 6: Stress reduction & caring for your emotional health

- Growing evidence from animal models that stress hormones contribute to risk of cognitive decline and dementia
- Sleep also important for reducing toxic molecules including beta amyloid.
- Methods for reducing stress
 - Social engagement
 - Outdoor activity
 - Pet therapy
 - Meditation/prayer
 - Close personal connections
 - Getting help when none of these work



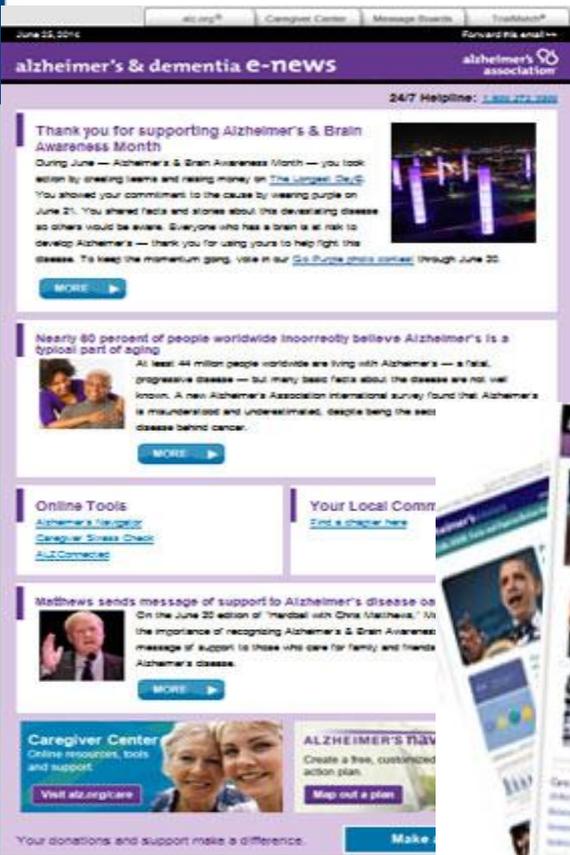
Xie et al 2013 Sleep initiated fluid flux drives metabolite clearance from the adult brain. Science 2013.



Step 7: Be apart of the solution...participate in research!

- Medical science has come a long way in the last 30 years
 - But still no cure for Alzheimer's disease
- Preventing Alzheimer's disease can only come with further research
 - Aimed at treatments that can be implemented early, safely, engaging the right targets and stabilize cognition and AD biomarkers
- Important to recognize that as we age, we are all at risk. And we will all be affected either directly or indirectly... We are all in the same boat





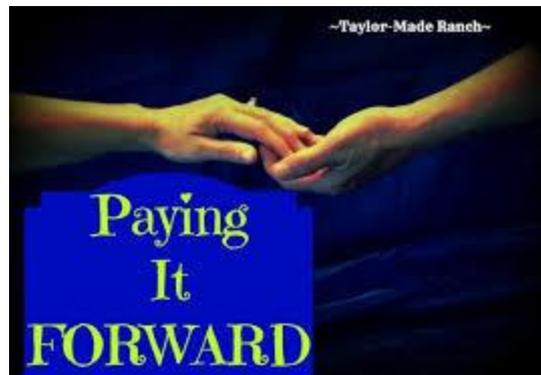
- Visit alz.org to register on line
- Hear about studies enrolling in your area
- Sign up for enews to receive **regular news** briefs about Alzheimer's care, research and events in each issue.
- And also receive up-to-date information on Alzheimer's research as it happens.



What to Expect if You Volunteer



- Benefits of Participating
 - Allows to take action against disease & be part of they solution
 - Access... to novel therapeutics and information
 - Looks ahead for the next generation
 - And gives hope for those fighting this disease



What to Expect if You Volunteer



Yoga feasibility studies

Not all trials test drugs

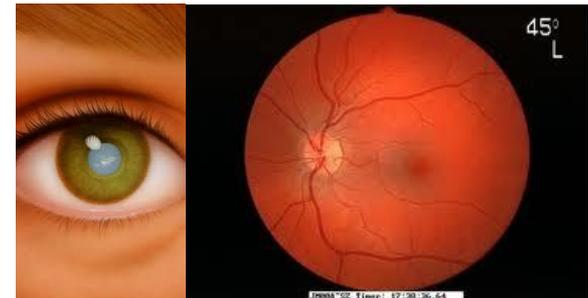
- Some trials are to test new methods to advance our early detection
- Some test non-drug interventions: lifestyle, behavioral therapy or new methods for changing brain health (e.g. TMS)



Duke Studies:

Retinal Imaging to Detect AD

- Study conducted by Duke Department of Ophthalmology and Bryan ADRC
 - Based on the idea that inflammation of retina (the light-sensitive layer at the back of the eye) is similar to brain inflammation in AD, and may identify individuals at risk of AD before memory impairment is evident
 - Retinal images may become an important tool in early diagnosis of AD
- Study involves a two-hour visit with complete retinal exam at the Duke Eye Center, at no charge to participant.
 - Current need for participants with mild cognitive impairment with memory loss
- If interested, please contact:
 - Cecilia Santiago-Turla (919-668-0634)

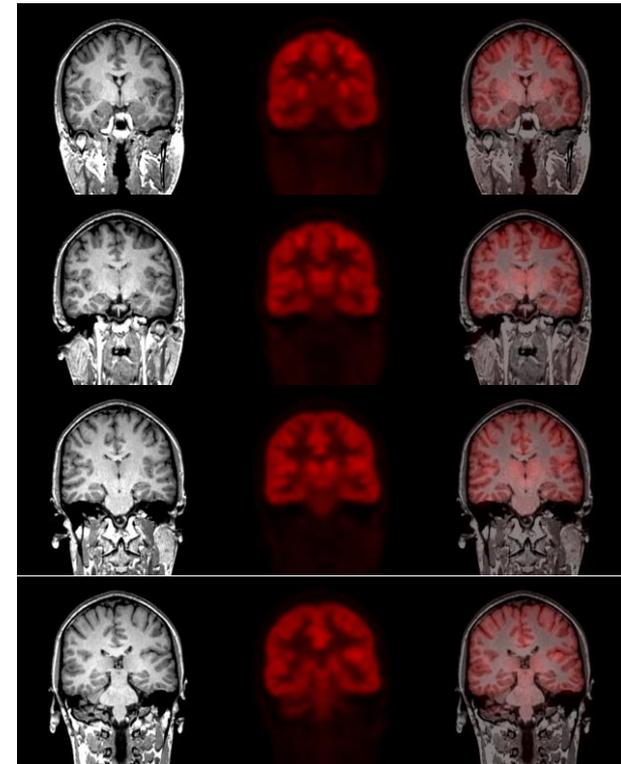




Duke-UNC-CH

Hybrid Brain Imaging Method- increasing diagnostic reliability (PET/MRI) in MCI

- Study to better understand adaptive change in Mild Cognitive Impairment due to Alzheimer's disease (MCI-AD)
 - Advances in brain imaging using magnetic resonance (MR) imaging and positron emission tomography (PET) show promise in diagnosing early AD.
- In this study, we will **combine** methods (PET/MR) to enhance early MCI-AD detection.



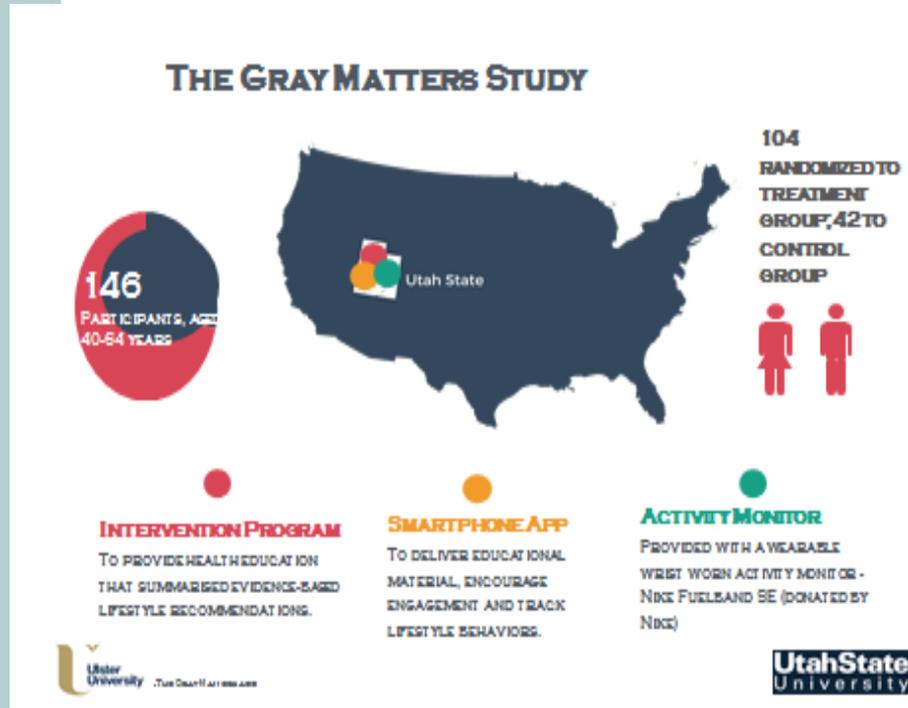


Cache County - Gray Matters Study

(USU & Ulster University- Norton et al, 2015)

- Study Utah, Duke, and Ulster University (Ireland) examining practical approaches with emerging technologies that will lead to sustained behavior changes in six domains of brain health

- Diet, exercise, cognitive stimulation, social engagement, stress reduction, sleep
- Customized, evidence-based health information & activity monitor
- Uses smartphone app



Norton, M.; Clark, C.; Tschanz, J.; Hartin, P.; Fauth, E.; Gast, J.; Dorsch, T. E.; Wengreen, H.; Nugent, C.; Robinson, D.; Lefevre, M.; McClean, S.; Cleland, I.; Schaeffer, S.; Aguilar, S. A multi-domain lifestyle intervention to lower Alzheimer's disease risk in middle-aged persons: the Gray Matters randomized trial. *Alzheimer's Dement. Transl. Res. Clin. Interv.* **2015**, Accepted (In Print).

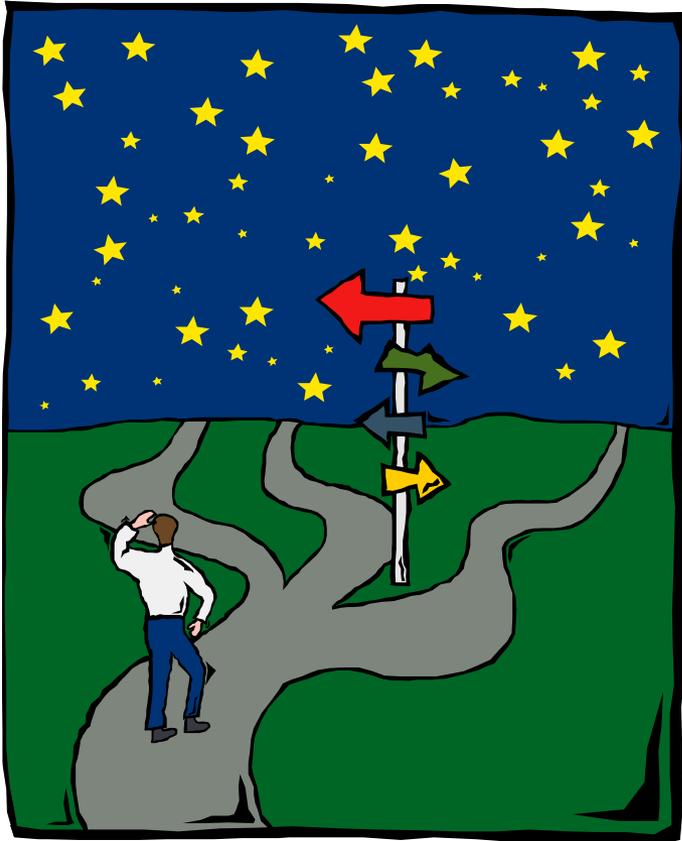


Is it Alzheimer's? What can I do about it?

- A lot you can do about it:*
- 1) Mindset shift- you matter*
 - 2) Treat what you can treat*
 - 3) Get active*
 - 4) Watch your weight & diet*
 - 5) Keep mind active with new things*
 - 6) Stress reduction & sleep*
 - 7) Help in research*



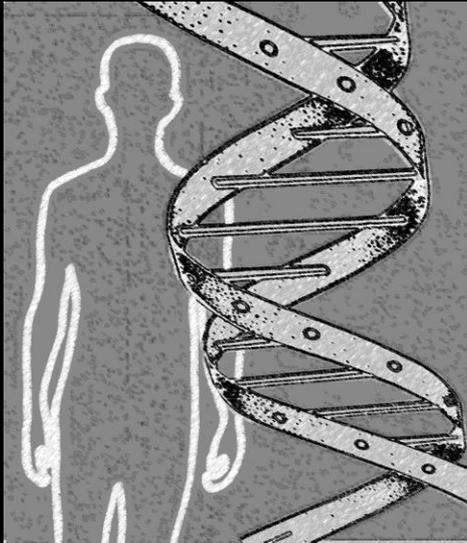
Where to turn when patients and families need assistance...



- Useful resources:
 - Alzheimer's Association
www.alz.org 800.272.3900
 - Area Agencies on Aging - Virginia
(<http://www.vda.virginia.gov/aaalist.asp>)
 - Family Support Program at Duke University:
DukeFamilySupport@duke.edu
919-660-7510 or 800 672 4213
 - Bryan Alzheimer's Disease Research Center
adrc@mc.duke.edu
866-444-ADRC (2372)

Bryan ADRC AD Prevention Registry

Be a part of the solution!
Every participant makes a difference!



***ADRC (866-444-ADRC or visit our website:
<http://adrc.mc.duke.edu>)***





The Bryan ADRC





THANK YOU