

Lowering the risk for Alzheimer's Disease

Intake: Nutrition & AD



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The Hippocampus



Hippocampal & cortical
brain regions are
affected in AD.

The Neuron

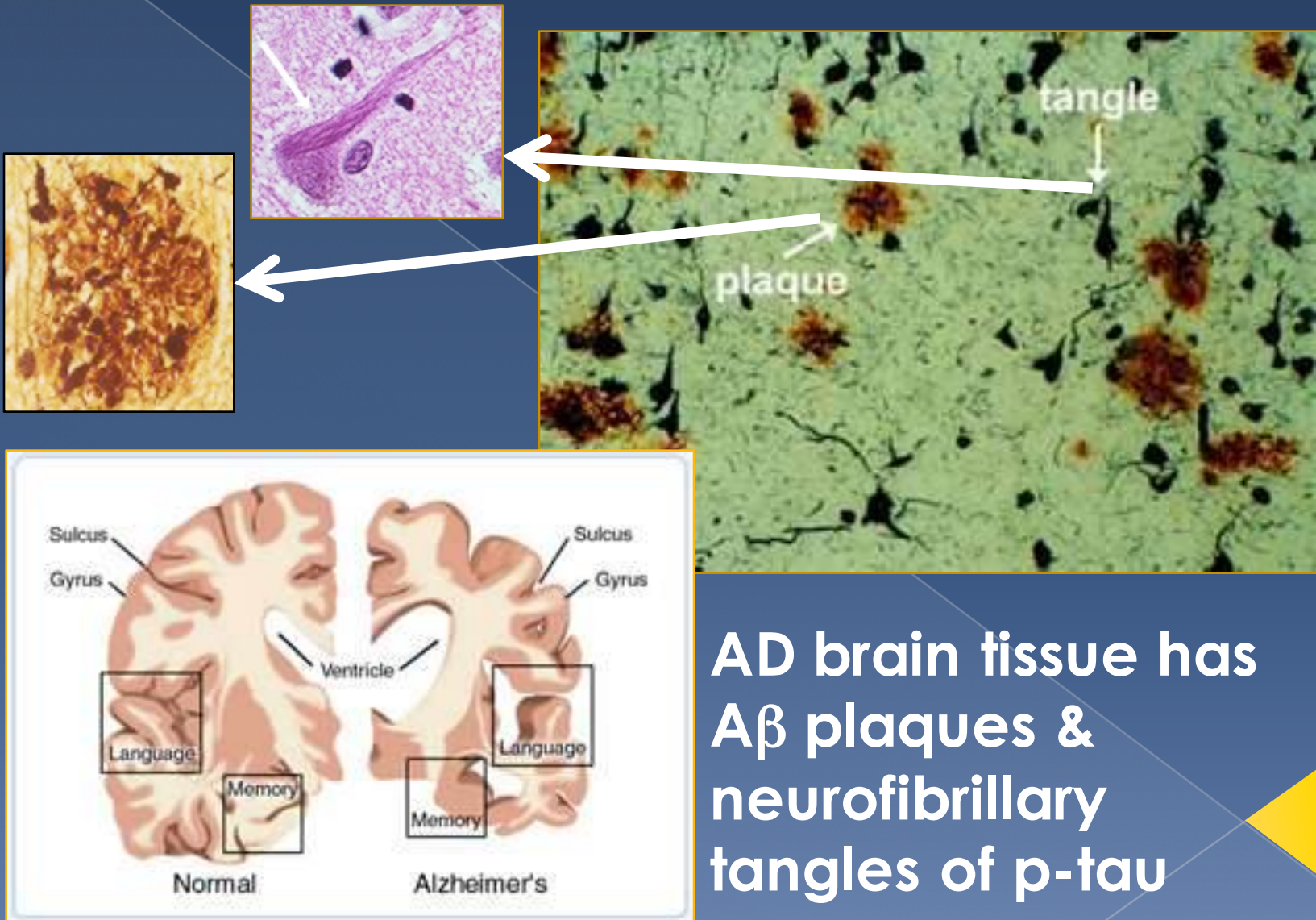


Neurons lose connections
(synapses)

Branches (dendrites) &
eventually die in AD

Other cells involved include
astrocytes,
oligodendrocytes,
microglia,
& endothelia.

Pathology

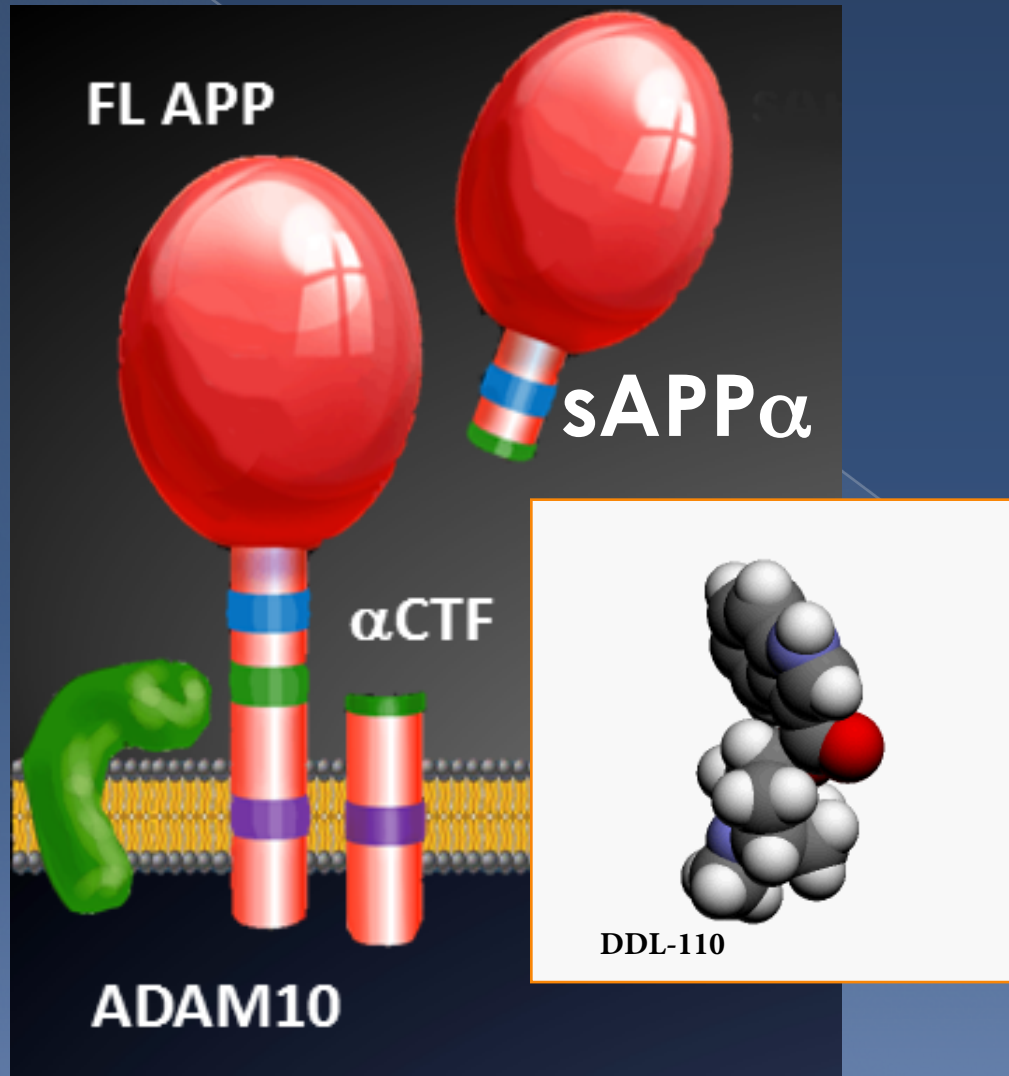


AD brain tissue has
 $A\beta$ plaques &
neurofibrillary
tangles of p-tau

Drug Discovery Lab Research

In a “library” of compounds we discovered “DDL110”, an sAPP α -enhancer.

It is now in clinical trials for Mild Cognitive Impairment & AD



Multimodal treatment

*Early & accurate
diagnosis*

Combination
drug therapy

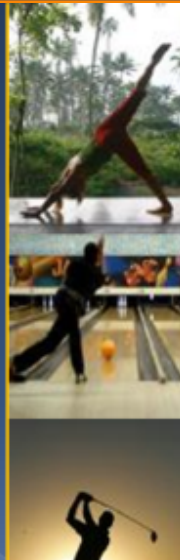
Healthstyle
support



Early diagnosis
& treatment
with more than
one drug.
Drugs are
more likely to
work if overall
health is
improved.



Output: Body & Mind



Exercise improves cognitive function
Use body & mind together by dancing, playing tennis or golf, or by yoga practice
Strength building equally important – it increases Brain-Derived Neurotrophic Factor (BDNF)



Intake

Scientific/biochemical bases for effects of nutrition & medication are discussed.



Output

Interactions, intellectual challenges, exercise, stress reduction & sleep are discussed.

Intake: Nutrition & AD

What are anti-oxidants?
A rainbow of possibilities
AGEs & the Mediterranean diet
Hydration!
Turmeric – R_x for AD?
Keep glycemic index low
Intermittent fasting?
Coconut oil is back
Resveratrol & thou

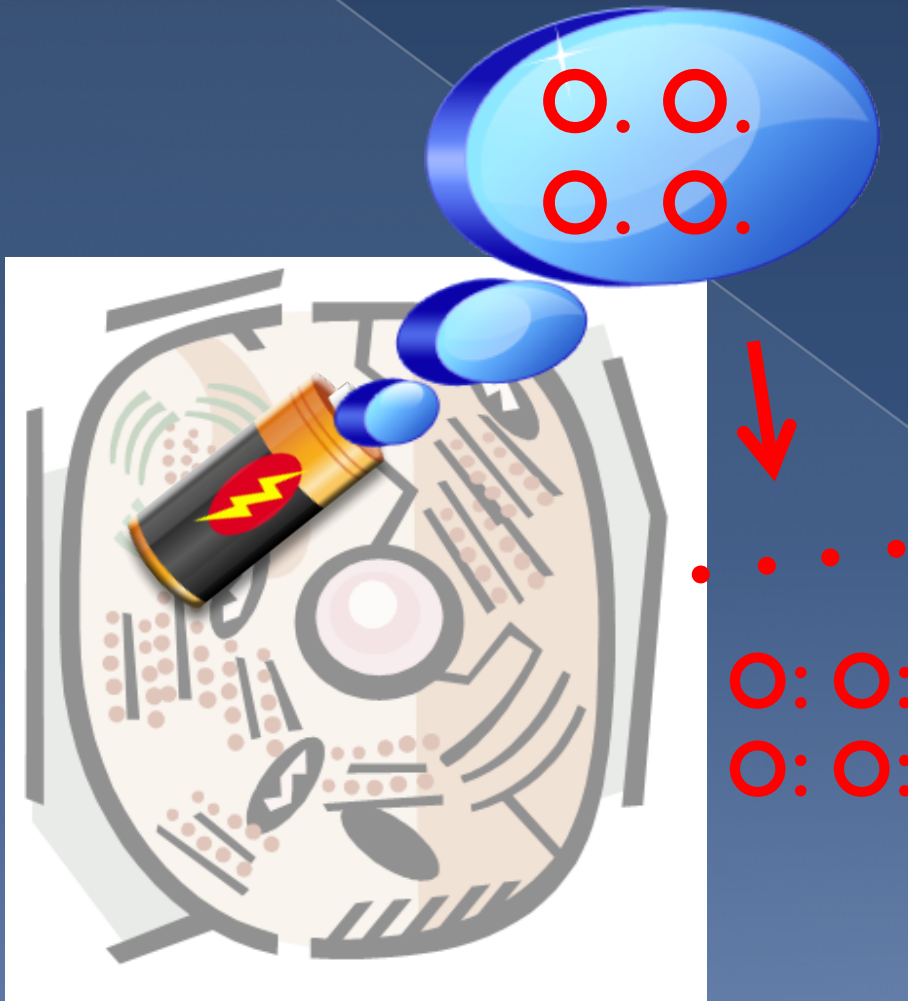


Intake



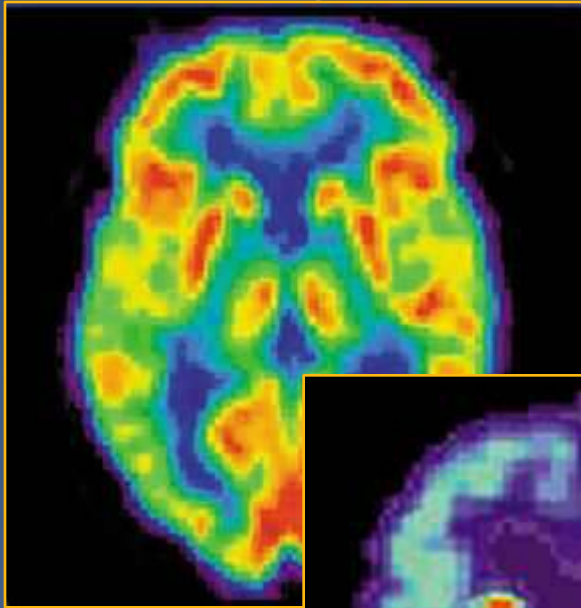
- Healthy food
- Anti-oxidant rich
- Low sugar
- Fewer calories
- Reduce gluten
- Lower protein
- A little caffeine (if tolerated)
- A little red wine (not if an alcohol problem is present)
- Probiotics
- Folic acid, B6, B12, D3

What are anti-oxidants?

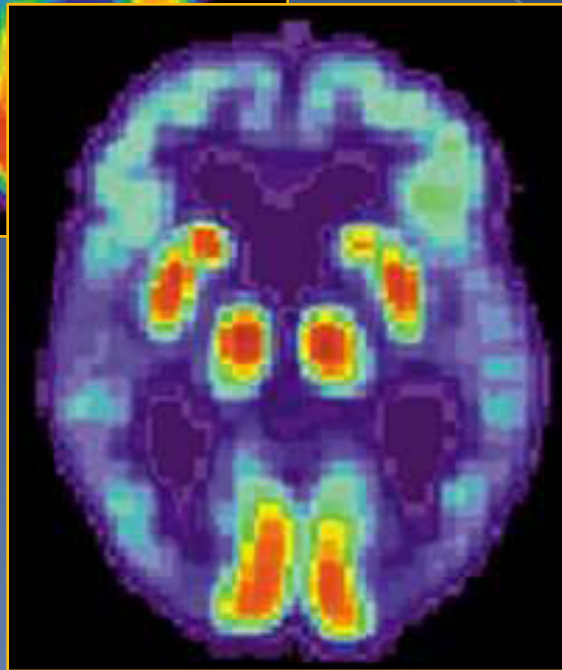


Mitochondria (powerhouses of the cell) use O_2 ($O:O$) generating radicals ($O\cdot$) missing an electron. Radicals will steal electrons from DNA & proteins, damaging tissue. Anti-oxidants are “radical scavengers” with electrons to donate

Anti-Oxidants & AD



Normal



AD

High energy use generates radicals. Damage accumulates in long-lived neurons.

Positron Emission Tomography (PET) shows low glucose utilization in AD brain due to damage.

Anti-oxidants may prevent this damage

Anti-oxidants: A Rainbow of Possibilities

Vitamin C & E in food best,
excesses may not be of
benefit

Turmeric (curcumin)

Blueberry (tocopherols)

Apples (quercetin, catechin)

Avocado (lutein)

Cabbage (anthocyanin)

Green tea (flavonoids)





Indian, Greek, Italian!

Cook to have control over your food

Increase vegetables for fiber

Increase fish, nuts for omega 3s

Reduce simple carbs & sugar

Concentrate flavors to be satisfied with smaller portions

The Mediterranean diet is lower in “Advanced glycation endproducts” (AGE!) & lowers risk for AD

Perrone & Grant. J Alzheimers Dis. 2015

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Lower Protein

Addition of carbohydrate or glucose to protein is glycation. Leads to stiffening tissues, cells & arteries.



AGEs reduced by:

- Cooking with moist heat
- Shorter cooking times
- Lower temperatures
- Addition of lemon juice or vinegar

Mark et al Consumption of a diet low in advanced glycation end products for 4 weeks improves insulin sensitivity in overweight women. Diabetes Care. 2014

The B vitamins

Co-enzymes for energy production.

Vitamin B₁ (thiamine)

Vitamin B₂ (riboflavin)

Vitamin B₃ (niacin)

Vitamin B₅ (pantothenic acid)

Vitamin B₆ (pyridoxine)

Vitamin B₇ (biotin)

Vitamin B₉ (folic acid)

Vitamin B₁₂ (cobalamins)



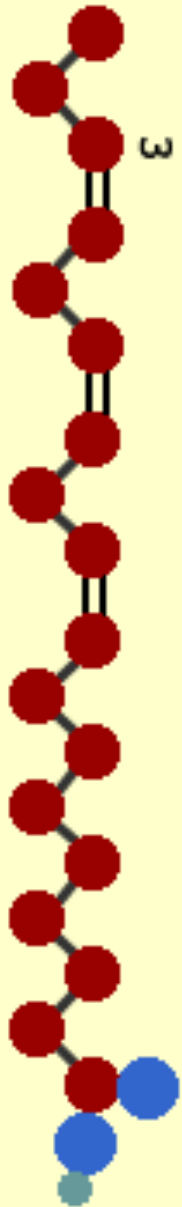
Moore et al Cognitive impairment and vitamin B12: a review. Int Psychogeriatr. 2012

Omega 3s

Omega 3 is found in fish, fish oil
winter squash, flaxseed, & nuts,
Lowers risk of cardiovascular
disease, & diabetes.

Lowers risk of AD by increasing
brain-derived neurotrophic
factor (BDNF)

Hadjighassem et al Oral consumption of α -
linolenic acid increases serum BDNF levels in
healthy adult humans. Nutr J. 2015



Caloric Restriction (CR)

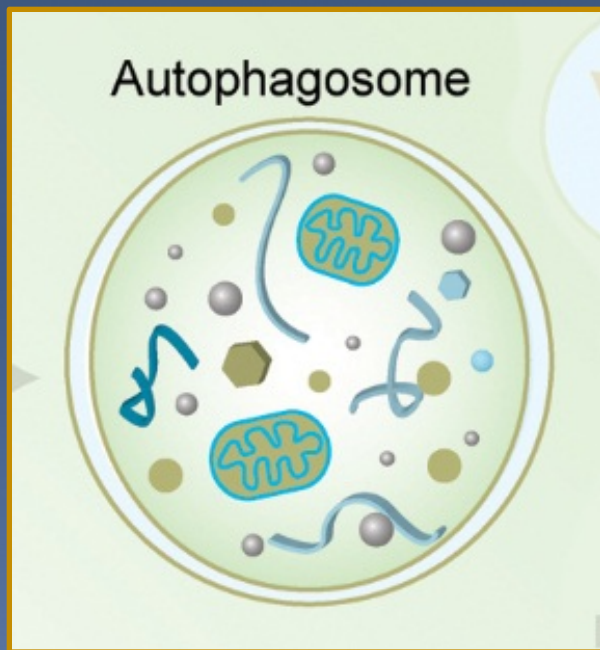
CR triggers “autophagy” which clears old proteins & cellular debris

Consider intermittent fasting – one day a month?

Do not eat for 12 hours between dinner & breakfast; do not eat within 3 hours of sleep

Or reduce calories + increase exercise

Spilman et al Inhibition of mTOR by rapamycin abolishes cognitive deficits and reduces amyloid-beta levels. PLoS One. 2010



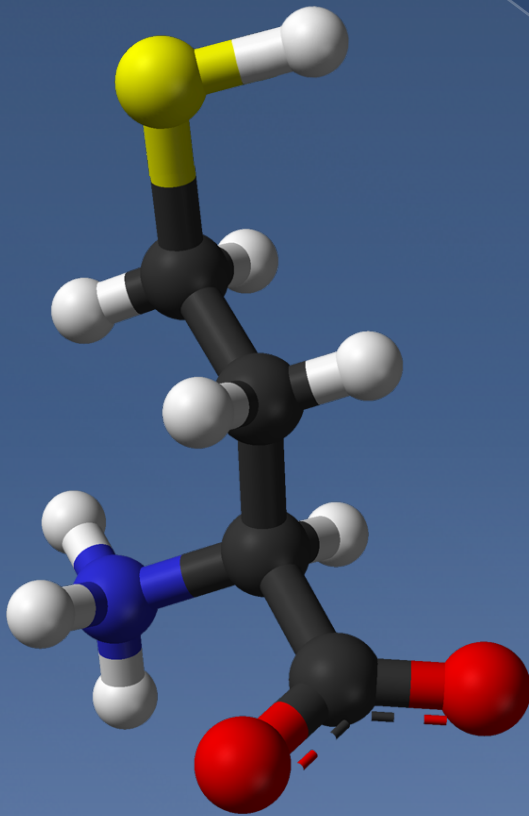
Homocysteine: Methionine

High homocysteine (HC) found in AD – have level determined.

HC from the sulfur-containing amino acid methionine

Lower HC by increasing B6/B12 & folic acid

Park et al SH, Kim H, Lee KJ. Correlations between homocysteine and grey matter volume in patients with Alzheimer's disease. Psychogeriatrics. 2015



Sugar



**Sugar induces insulin production
Insulin degraded by neprilysin &
insulin degrading enzyme,
competing with A β .**

**Adult-onset diabetes a risk
factor for AD. *Keep glycemic
index low***

Ma et al Conversion of mild cognitive
impairment to dementia among subjects with
diabetes: a population-based study of incidence
and risk factors with five years of follow-up. J
Alzheimers Dis. 2015

Hydration



Chronic dehydration can impair mental function & normal digestion

Older people at risk for dehydration due to low water consumption, chronic illness & certain medications

Consume some electrolyte (but low sugar)-containing liquid.

Faraco et al Water deprivation induces neurovascular and cognitive dysfunction through vasopressin-induced oxidative stress. J Cereb Blood Flow Metab. 2014

Memory Loss

Accurate Diagnosis is Critical

Diagnostics include:

Computer-assisted tomography (CAT) for structural abnormalities

Positron emission tomography (PET) for glucose use and amyloid imaging

Function magnetic resonance (fMRI) for blood flow

Tests of cognitive function

Other causes of memory loss:

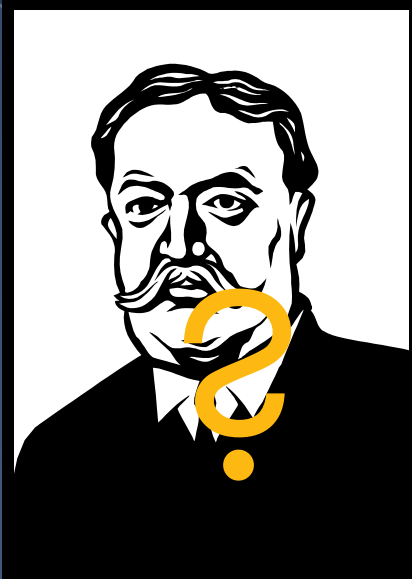
Depression, infection, multiple sclerosis, low B12, hypothyroidism, medication interactions, tumor

Not all dementia is AD:

Vascular dementia, Parkinson's disease, frontotemporal dementia

UCLA Memory Disorders Clinic (310) 794-6039

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Not

