

# **PREVENT AND REVERSE ALZHEIMER'S**

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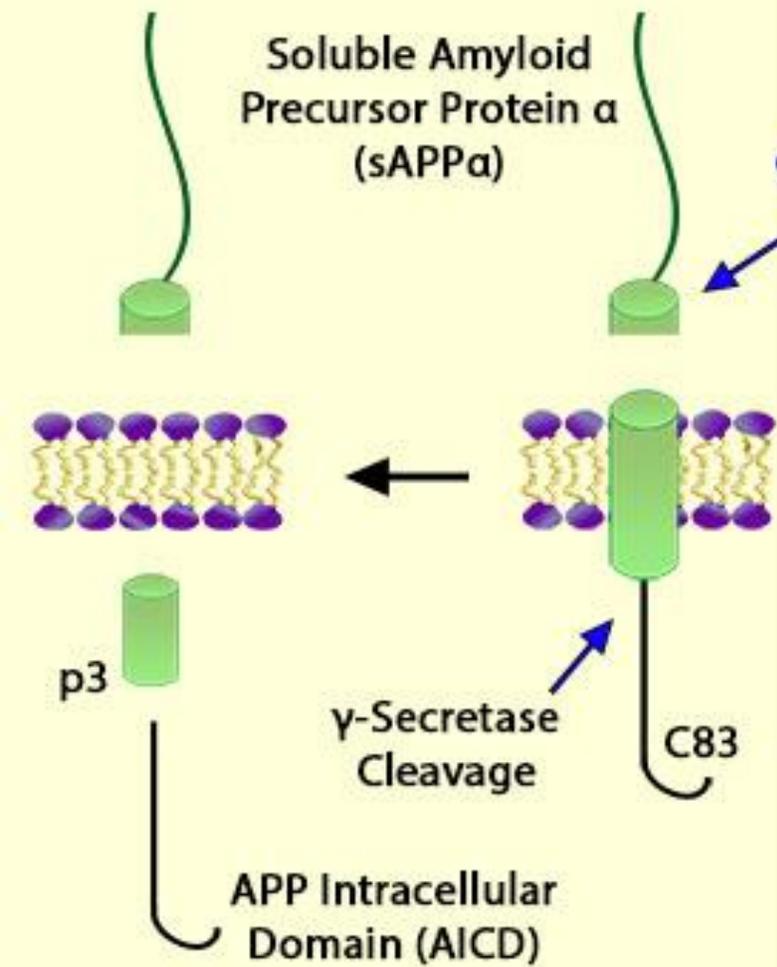




# HUMAN BRAIN IN NUMBERS

- **86 billion neurons**
- **100 trillion connections – 1000 times as many connections as neurons**
- **85 billion glial cells (i.e., astrocytes, microglia, ependymal cells, and oligodendrocytes – support proper structure and function of the neurons**
- **69 billion (80%) of neurons are in the cerebellum**
- **Consumes 20-25% of the total body energy**

## Non-Amyloidogenic APP Processing



Extracellular

Amyloid Precursor Protein (APP)

$\alpha$ -Secretase Cleavage

$\beta$ -Secretase Cleavage

Intracellular

$\beta$  Amyloid Plaques

Soluble Amyloid Precursor Protein  $\beta$  (sAPP $\beta$ )



A $\beta$ 42

sAPP $\beta$

$\gamma$ -Secretase Cleavage

AICD

C99

# AMYLOID PRECURSOR PROTEIN – TWO PIECE SPLIT VERSUS FOUR PIECE SPLIT

- Healthy lifestyle habits lead to amyloid precursor protein splitting into two parts, pieces that nourish nerves and strengthen and develop brain connections
- Unhealthy lifestyle habits lead to amyloid precursor protein splitting into four parts, one of which is amyloid Beta, which builds up and increases risk of Alzheimer's disease
- Therefore, both outcomes may motivate toward the healthiest lifestyle possible, one directly, the latter indirectly, if we refuse to settle for the status quo and search for the underlying causes of AD with the intention of changing the way we live, accordingly

**Dementia is defined as a decline in mental ability severe enough to interfere with activities of daily living.**

Alzheimer's afflicts **one in nine**  
Americans **65 and older,**  
or **5.2 million** people.



# ALZHEIMER'S DISEASE IS A GROWING SCOURGE

- Alzheimer's disease (AD) is the most common form of dementia
- Alzheimer's Disease (AD) accounts for 60% to 80% of all cases.
- AD currently affects over 5 million Americans
- AD afflicts 30 million individuals worldwide
- Of the 318+ million people currently living in the United States, 45 million will develop AD
- 40% to 50% of individuals aged 85 years or older suffer from AD

**A woman's chance of  
developing AD is now greater  
than her chance of developing  
breast cancer.**

**AD is now the third leading  
cause of death in the United  
States.**

# RANKING CAUSES OF DEATH IN 2021 BY NUMBER OF DEATHS

1. **Heart disease - 693,021**
2. **Cancer - 604,553**
3. **COVID-19\* - 415,399**
4. **Unintentional injuries - 219,487**
5. **Stroke - 162,590**
6. **Chronic lower respiratory diseases - 142,047**
7. **Alzheimer disease - 119,314\*\***
8. **Diabetes - 103,004**
9. **Chronic liver disease and cirrhosis - 56,408**
10. **Kidney disease - 54,236**

\*confirmed or presumed

\*\*An estimated **503,400 deaths** in Americans aged 75+ attributable to AD in 2010

# WITH AD, LONGER MAY NOT BE BETTER

- Public Health England reports life expectancy has increased to 79.5 years for men
- These men can expect to live the last fifth of their life in poor health
- Women now live even longer to an average of 83.1 years
- These women can expect to spend “nearly a quarter of their lives in ill-health

# DRUGS DON'T WORK

- **99.6% of medications to treat Alzheimer's failed in trials**
- **Only 0.4% of experimental drugs ever reach the market**
- **No new Alzheimer's drug has been approved since 2003**
- **Currently approved medications are ineffective at stopping or slowing Alzheimer's**
- **244 experimental drugs tested from 2000 to 2010, only one approved - memantine**



# DESTROYING BETA-AMYLOID DOESN'T WORK

- Alzheimer's is characterized by accumulation of sticky, synapse-destroying beta-amyloid plaques
- Beta-amyloid is formed by a series of steps
- Drugs blocking these or destroying amyloid were successful
- However, patients did not get better or even worsened
- These clinical trials cost up to \$50 million dollars each
- Alzheimer's is typically treated as a single disease with donepezil (Aricept) and memantine (Namenda)



The brain suffers some injury,  
infection, or other assault and  
defends itself by producing  
amyloid.



Alzheimer's is a protective response to **inflammation, suboptimal nutrients and synapse-supporting molecules, and toxic exposures.**



To reverse Alzheimer's, one must address inflammation/infection, insulin resistance, hormone and nutrient depletion, toxin exposure, and replacement and protection of lost/dysfunctional synapses.



Alzheimer's is the result of an  
intrinsic and healthy downsizing  
of the extensive synaptic  
network...



...that has run amok, gone  
haywire.



**Papers published by Dr. Dale Bredeesen demonstrate symptoms of mild cognitive impairment (MCI) and early AD may often be reversed within 6 months after initiating a comprehensive, functional and lifestyle medicine-focused program.**

*The* **End** *of*  
**Alzheimer's**  
**Program**

THE FIRST PROTOCOL TO  
Enhance Cognition  
and Reverse Decline

AT ANY AGE



NEW YORK  
TIMES  
BESTSELLER

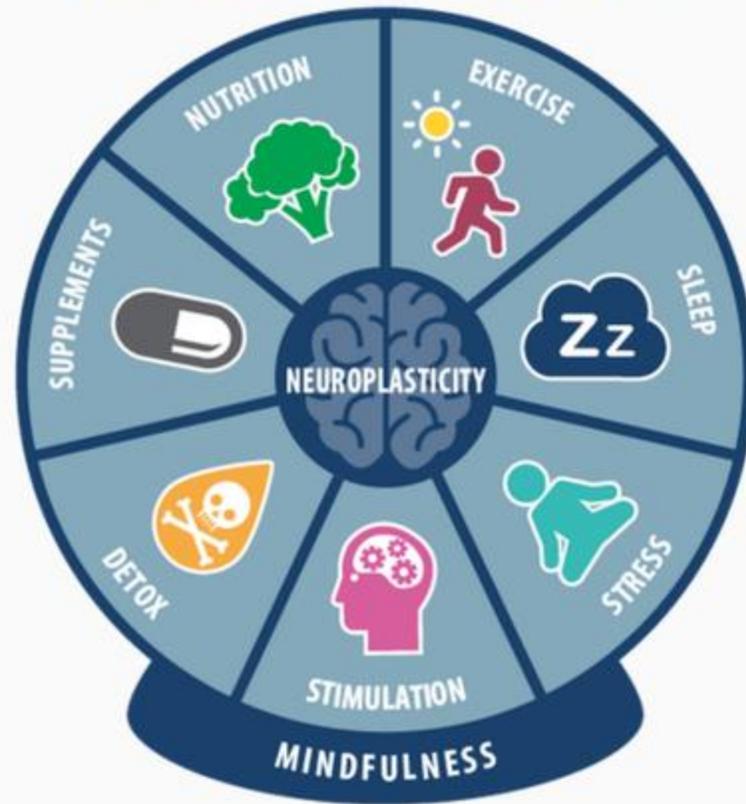
The *New York Times* bestselling author of *The End of Alzheimer's*

**DALE E. BREDESEN, MD**

Foreword by David Perlmutter, MD



# THE BREDESEN 7



# THE TAKE HOME MESSAGE

- **Eat 95% of your diet WFPB (i.e., beans, whole grains, vegetables, fruits)**
- **Eat low glycemic – 40 or less – see handout at [drnewstart.com](http://drnewstart.com)**
- **Maximize intake of plants rich in omega-3 essential fats**
- **Eat one tablespoon of seeds (i.e., sunflower, sesame, Chia, pumpkin)**
- **Build your diet on above-ground vegetables, 50% raw and 50% cooked**
- **Stroll for 15 to 30 minutes right after breakfast and lunch**
- **Exercise for 30 to 60 minutes six days a week, 50% aerobic & 50% weight training**
- **Brush and floss teeth daily**

# THE TAKE HOME MESSAGE

- **Retire at 9:30 PM nightly – 7 to 9 hours of total sleep duration**
- **Nothing to eat or drink after 3 PM, or a dinner of fruit or vegetable soup and finish by 6 PM**
- **Maintain vitamin D level of 45 to 60**
- **Maintain vitamin B12 level of 1100 to 1500**
- **Choose organic whole grains, and the Dirty Dozen should be organic, peeled, or washed in dilute salt water**
- **Leave off all processed, packaged, and prepared foods, containing processed oils, white flour, and added sugars**
- **Take the STOP-BANG screening and treat sleep apnea, if present**
- **Eat the widest variety of whole plant foods possible over time**

# THE TAKE HOME MESSAGE

- **Discontinue alcohol and caffeine**
- **Leave off NSAIDS, aspirin, and any truly unnecessary medications**
- **Bring homocysteine (Hcy) to <7.0**
- **Screen for toxins and mycotoxins, and treat, as applicable**
- **Treat chronic sinusitis, gingivitis, dental caries, other chronic infections**
- **If you have a true gluten allergy, choose lowest glycemic index gluten-free grains**
- **Read and memorize Scripture in order to know Christ**

# BASICS TENETS OF THE BREDESEN PROTOCOL

- The approach is personalized based on 150+ data points, including labs, MRI, gene evaluation, cognitive testing (e.g., Montreal Cognitive Assessment), and a detailed medical and family history
- One of the easiest and most affordable ways to test for Alzheimer's-related gene mutations is to order a *Health and Ancestry* gene saliva test at <http://www.23andme.com>
- The Bredesen Protocol encourages a broad evaluation of gene mutations, but specifically analyzes the following genes: **ApoE**, **MTHFR**, **BDNF**, **APP** (i.e., amyloid precursor protein), **PSEN1**, and **PSEN2** (i.e., presenilins).

# LAB TESTS OF THE BREDESEN PROTOCOL

- To determine whether patient has a destructive inflammatory pattern or a healing protection pattern is assessed by labs:
- **hsCRP; interleukin-6 (IL6); tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ); homocysteine; vitamin B6; vitamin B12; folate; vitamin D as 25-OH-D; vitamin C; vitamin E; omega 6:3 ratio; a comprehensive metabolic panel that includes albumin, globulin, creatinine, blood urea nitrogen (BUN), estimated glomerular filtration rate (eGFR), glucose, calcium, and potassium; NMR LipoProfile that includes the low-density lipoprotein (LDL) cholesterol particle number, small LDL particle number, and LDL size, as well as all the components of the standard lipid profile that include total, LDL, and high-density lipoprotein cholesterol and triglycerides; total glutathione; and hemoglobin A1C**

# LAB TESTS OF THE BREDESEN PROTOCOL

- Additionally, because insulin resistance is one of the most significant metabolic drivers toward cognitive decline and AD, the Youngberg Clinic includes a **4-hour glucose tolerance test**, which also assesses blood levels of **insulin at fasting, 1 hour, and 2 hours** and assesses **cortisol levels at fasting, 3 hours, and 4 hours**. Trophic factors, including **estradiol, progesterone, pregnenolone, cortisol, DHEA-sulfate, testosterone, free testosterone, and a comprehensive thyroid profile**, including thyroid stimulating hormone, free T4, free T3, reverse T3, thyroid peroxidase antibody, and thyroglobulin antibody, are *tested and optimized*.

# LAB TESTS OF THE BREDESEN PROTOCOL

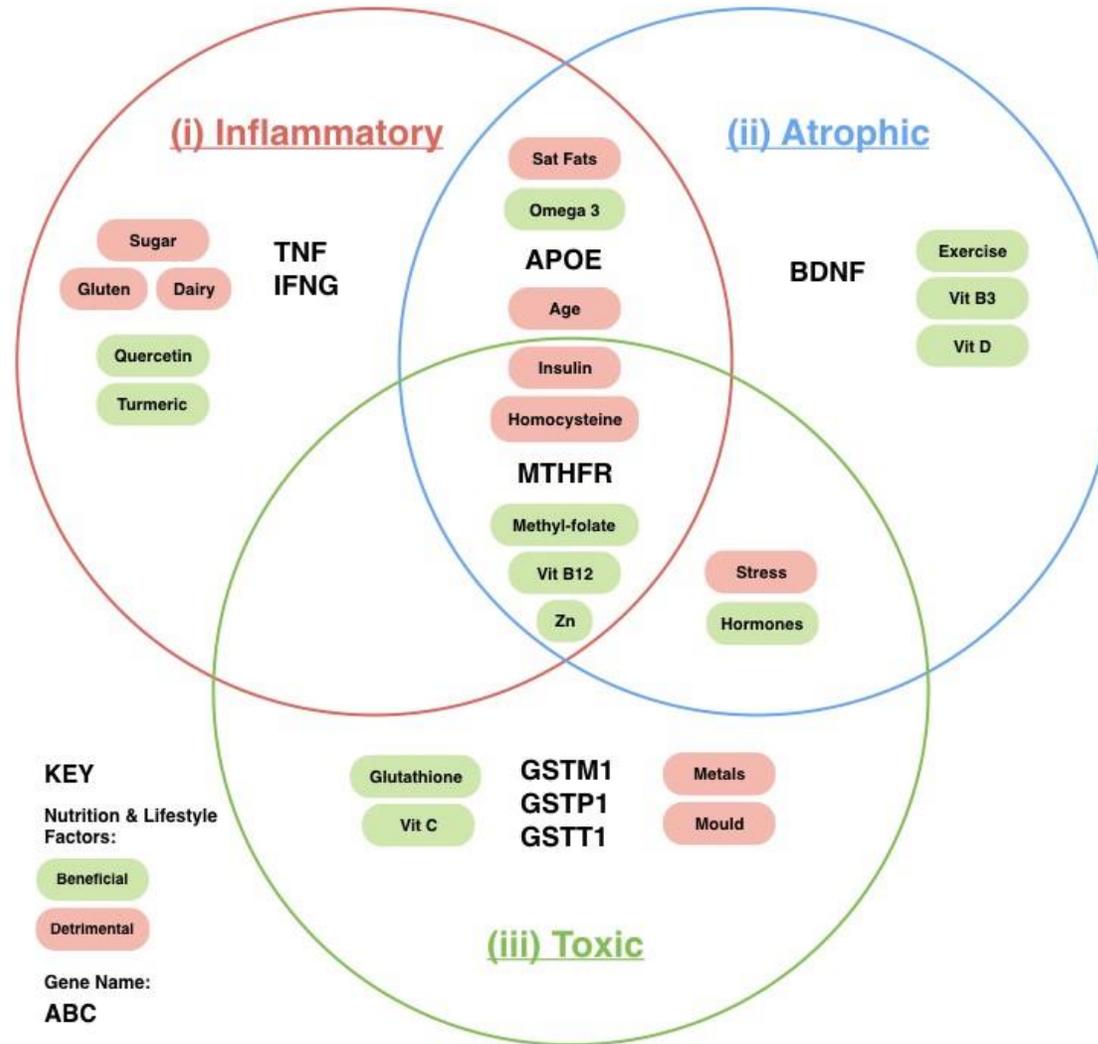
- Additionally, screening for exposure to toxic metals or imbalances of nutrient elements in whole blood is recommended. The elements evaluated with this test are **calcium, copper, lithium, magnesium, manganese, molybdenum, selenium,** and **zinc** as well as potentially toxic elements such as **arsenic, cadmium, cobalt, lead, mercury, silver,** and **strontium**
- Finally, additional lab tests for **mold** and **other biotoxin-related** causes of cognitive impairment are also assessed in the Bredesen Protocol.

# THREE TYPES OF ALZHEIMER'S

- **Alzheimer's is not a single disease**
- **There are three main subtypes**
- **Each is driven by different biochemical processes**
- **Each requires a different treatment**
- **Treating all forms the Alzheimer's the same is like treating every infection with the same antibiotics**



# Alzheimer's disease: the three subtypes



**Quercetin is contained in abundance in apples, raspberries, onions, red grapes, cherries, citrus fruits, and green leafy vegetables. Among vegetables and fruits, quercetin content is highest in onions.**

# THREE TYPES OF ALZHEIMER'S

- **Inflammatory (hot):**
  - Up-regulated immune system increases inflammation
  - Insulin resistance
  - Arthritis
- **Atrophic (cold):**
  - Reduced support from hormones — thyroid (T3), adrenal (cortisol), sex hormones (estrogen, progesterone, testosterone)
  - Vitamin D
  - Increased homocysteine
  - Insulin resistance

# THREE TYPES OF ALZHEIMER'S

- **Toxic (Vile):**
  - Atypical
  - Younger age
  - No family history, and more often in APOE E3 carriers not APOE E4.
  - Symptom onset usually follows stress, sleep loss, anesthesia or menopause
  - Characterized by hypothalamic-pituitary- adrenal axis (HPA) dysfunction
  - Metal toxicity (mercury, lead or iron)
  - High homocysteine, low zinc, and elevated copper
  - Chronic inflammatory response syndrome (CIRS) — a reaction to mycotoxins (found in mold)

# SIX SUBTYPES OF ALZHEIMER'S

## Type 1, Inflammatory:

- This type is associated with inflammatory markers such as high-sensitivity **CRP** (hsCRP)
- The inflammation may be a result of **infections, suboptimal diet**, or other factors
- Risk for type 1 is increased by **ApoE4, chronic infections, trans fats**, and other factors.

# SIX SUBTYPES OF ALZHEIMER'S

## Type 1.5, Glycotoxic (Sugar Toxicity):

- Type 1.5 has features of both type 1 (inflammatory) and type 2 (atrophic)
- In this type, chronically **high glucose levels** damage multiple proteins, cells, and tissues, leading to **inflammation** and **auto-antibodies**, all of which increase the risk for type 1 AD
- Meanwhile, the responding **high insulin levels** and associated insulin resistance **reduce** the **trophic effects** of insulin and increase risk for type 2
- Risk for type 1.5 is increased by ApoE4, type 2 diabetes, and prediabetes

# SIX SUBTYPES OF ALZHEIMER'S

## Type 2, Atrophic (decrease in size of body part, cell, organ, or tissue)

- This type is associated with especially **rapid reduction** in **trophic support** such as **estradiol, testosterone, insulin, vitamin D, and neurotrophins (BDNF)**
- Risk for type 2 is increased by **ApoE4, early hysterectomy/oophorectomy** without hormone replacement, **low vitamin D** levels, and in some cases **menopause/andropause**
- It is important to rule out **sleep apnea** as well.

# SIX SUBTYPES OF ALZHEIMER'S

## Type 3, Toxic (Exposure to Toxins):

- Type 3 is quite different from types 1, 1.5, and 2
- It often presents with features **other than (or in addition to) memory loss**, such as **depression** and **problems in calculating, organizing, following instructions, or word finding**
- Type 3 is associated with exposure to **toxins** (dementogens) such as **mercury, high copper** levels, **anesthetics, mycotoxins** (toxins produced by molds), or **tick-related toxins** (e.g., from Lyme disease)
- Risk for type 3 is **not increased** and may **even be decreased** by ApoE4

# SIX SUBTYPES OF ALZHEIMER'S

## Type 4, Vascular (Atherosclerosis or Hardening of the Arteries):

- We used to think of **vascular disease** as being unrelated to AD
- However, over the past several years, it has become clear **vascular abnormalities** contribute importantly to AD
- In type 4, **chronic vascular disease** may be associated with **high homocysteine, vascular amyloid, or breach of the blood-brain barrier** (among other contributors)
- All the above are associated with the development of AD

# SIX SUBTYPES OF ALZHEIMER'S

## Type 5, Traumatic (Traumatic Brain Injury):

- When the brain is **traumatized**, for example, as a result of an auto accident
- The **amyloid** associated with AD is produced as **a response**
- **Trauma** is, thus, a risk factor for AD
- In many cases, the amyloid is removed, followed by **chronic traumatic encephalopathy**
- We now know that **chronic traumatic encephalopathy** is common in football players and in other contact sports as was featured in the film, "Concussion"
- Type 5 typically **lacks amyloid**, but is related to AD in featuring **neurofibrillary tangles** made of the  **$\tau$ -protein**

Alzheimer's can be prevented,  
and its cognitive decline can often  
be reversed.



# REMOVING THE CAUSE OF AMYLIOD BUILD UP IS KEY



# APOE4 IS THE STRONGEST GENETIC RISK FACTOR

- ApoE4 is an apolipoprotein that carries lipids or fats
- One ApoE4 gene increases Alzheimer's 30%
- Two copies of this gene elevates risk 50 to 90%
- People with zero copies of this allele have 9% risk
- Optimal program can reduce Alzheimer's risk even if carrying ApoE4
- 75 million Americans carry ApoE4



**However, while genes may load  
the gun, lifestyle pulls the  
trigger.**

## Genetic Studies of Human Apolipoproteins. X. The Effect of the Apolipoprotein E Polymorphism on Quantitative Levels of Lipoproteins in Nigerian Blacks

To date, Nigerian blacks have the highest observed frequency of the *APO E\*4* allele in world populations

### Summary

Human apolipoprotein E exhibits genetic polymorphism in all populations examined to date. By isoelectric focusing and immunoblotting, three common alleles have been demonstrated in 365 unrelated Nigerian blacks. Furthermore, the *APO E* genetic polymorphism's effect on quantitative levels of lipids and lipoproteins has been determined. The respective frequencies of the *APO E\*2*, *APO E\*3*, and *APO E\*4* alleles are .027, .677, and .296. The effect of *APO E* polymorphism is significant only on total cholesterol and low-density lipoprotein cholesterol. The average excesses of the *APO E\*2* allele are to lower total cholesterol and low-density lipoprotein cholesterol by 9.19 mg/dl and 11.11 mg/dl, respectively. The average excesses of the *APO E\*4* allele are to increase total cholesterol and low-density lipoprotein cholesterol by 5.64 mg/dl and 6.18 mg/dl, respectively. On the basis of the differences in (a) the distribution of *APO E*

# Alzheimer's disease: the cholesterol connection

ApoE is one of the major apolipoproteins in the plasma and the principal cholesterol carrier protein in the brain.

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A hallmark of all forms of Alzheimer's disease (AD) is an abnormal accumulation of the  $\beta$ -amyloid protein ( $A\beta$ ) in specific brain regions. Both the generation and clearance of  $A\beta$  are regulated by cholesterol. Elevated cholesterol levels increase  $A\beta$  in cellular and most animal models of AD, and drugs that inhibit cholesterol synthesis lower  $A\beta$  in these models. Recent studies show that not only the total amount, but also the distribution of cholesterol within neurons, impacts  $A\beta$  biogenesis. The identification of a variant of the apolipoprotein E (*APOE*) gene as a major genetic risk factor for AD is also consistent with a role for cholesterol in the pathogenesis of AD. Clinical trials have recently been initiated to test whether lowering plasma and/or neuronal cholesterol levels is a viable strategy for treating and preventing AD. In this review, we describe recent findings concerning the molecular mechanisms underlying the cholesterol-AD connection.

Alzheimer's disease (AD) is the most common form of dementia, affecting up to 15 million individuals worldwide. Because of the

Early-onset familial AD (FAD) has so far been linked to mutations in the genes for the  $\beta$ -amyloid precursor protein (*APP*) or



## Genetic Studies of Human Apolipoproteins. X. The Effect of the Apolipoprotein E Polymorphism on Quantitative Levels of Lipoproteins in Nigerian Blacks

To date, Nigerian blacks have the highest observed frequency of the *APO E\*4* allele in world populations, but their adjusted mean cholesterol level is among the lowest reported in studies of the cholesterol/APO E relationship. This is probably due to a diet that is low in animal fat

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## Genetic Studies of Human Apolipoproteins. X. The Effect of the Apolipoprotein E Polymorphism on Quantitative Levels of Lipoproteins in Nigerian Blacks

The Yoruba, in the Idikan wards, consume a low-calorie, low-fat diet, consisting mainly of grains, roots, and tubers

### Summary

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## Serum Total Cholesterol,

In Nigeria, where the frequency of apoE  $\epsilon$ 4 allele is high [31] but there are low cholesterol levels [32], AD seems to be rare [33]. However, African Americans have as high a prevalence of AD as other Americans and Western peoples [25, 33]. The association between apoE genotype and cholesterol concentration may be the result of a Western lifestyle since no association was found in an African Bushmen population with low plasma cholesterol

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# Apolipoprotein E $\epsilon$ 4 Allele, Elevated Midlife Total Cholesterol Level, and High Midlife Systolic Blood Pressure Are Independent Risk Factors for Late-Life Alzheimer Disease

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**Participants:** Participants were derived from random population surveys from 1972, 1977, 1982, and 1987. A total of 1449 persons (73%), 65 to 79 years of age, participated in the reexami-

**Results:** The apoE  $\epsilon$ 4 allele was an independent risk factor for Alzheimer disease, even after adjustment for midlife vascular risk factors and other confounders (odds ratio, 2.1 [95% CI, 1.1 to 4.1]). Similarly, elevated midlife values for serum total cholesterol level (odds ratio, 2.8 [CI, 1.2 to 6.7]) and systolic blood pressure (odds ratio, 2.6 [CI, 1.1 to 6.6]) were independent risk factors for Alzheimer disease, even after adjustment for apoE genotype and other confounding factors.

and high midlife systolic blood pressure are independent risk factors for Alzheimer disease. The risk for Alzheimer disease from treatable factors—elevated total cholesterol level and blood pressure—appears to be greater than that from the apoE  $\epsilon$ 4 allele.



# Apolipoprotein E $\epsilon$ 4 Allele, Elevated Midlife Total Cholesterol Level, and High Midlife Systolic Blood Pressure Are Independent Risk Factors for Late-Life Alzheimer Disease

The risk for Alzheimer disease from treatable factors—elevated total cholesterol level and blood pressure—appears to be greater than that from the apoE  $\epsilon$ 4 allele.

recently as risk factors for Alzheimer disease.

**Objective:** To study the relative importance and the putative relationship among the apoE  $\epsilon$ 4 allele, midlife total cholesterol level, and midlife blood pressure as risk factors for late-life Alzheimer disease.

**Design:** Prospective population-based study.

**Setting:** Kuopio and Joensuu, eastern Finland.

**Participants:** Participants were derived from random population surveys from 1972, 1977, 1982, and 1987. A total of 1449 persons (73%), 65 to 79 years of age, participated in the reexami-

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**Conclusions:** The association between the apoE  $\epsilon$ 4 allele and Alzheimer disease does not seem to be mediated by vascular factors. The apoE  $\epsilon$ 4 allele, elevated midlife total cholesterol level, and high midlife systolic blood pressure are independent risk factors for Alzheimer disease. The risk for Alzheimer disease from treatable factors—elevated total cholesterol level and blood pressure—appears to be greater than that from the apoE  $\epsilon$ 4 allele.



## Apolipoprotein E and High Midlife Values as Risk Factors for Alzheimer Disease

Projecting from our data, we believe that adherence to effective pharmacologic and non-pharmacologic interventions could reduce a person's risk for Alzheimer disease from an odds ratio of 8.4 to 11.0 to an odds ratio as low as 2.1, even in an  $\epsilon 4$  carrier.

## Cholesterol Level, Blood Pressure, and Risk

Miia Kivipelto, MD; Eeva-Liisa Savolainen, MD, PhD; Jaakko Tuomilehto, MD, PhD; Raine Malmgren, MD, PhD; Jukka Savolainen, MD, PhD; Kari Alhainen, MD, PhD; Susan Lyytikäinen, MS; Arto Mannermaa, PhD; Jaakko Tuomilehto, MD, PhD; Aulikki Nissinen, MD, PhD; and Hilikka Soininen, MD, PhD

**Background:** Presence of the apolipoprotein E (apoE)  $\epsilon 4$  allele, which is involved in cholesterol metabolism, is the most important genetic risk factor for Alzheimer disease. Elevated midlife values for total cholesterol level and blood pressure have been implicated recently as risk factors for Alzheimer disease.

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# BREDESEN'S FIRST SUCCESS STORY

- **67-year-old female with two years of progressive memory loss.**
- **A demanding job involved preparing analytical reports and traveling widely**
- **No longer able to analyze data or prepare reports**
- **Forced to consider quitting her job**
- **Unable to remember the material she had just read**
- **No longer able to remember numbers - had to write down even 4-digit numbers**
- **Trouble navigating even on familiar roads, mix up the names of her pets, & forget where light switches were**



# HER THERAPEUTIC PROGRAM

- Eliminated all **simple carbs**
- Eliminated all **processed foods**
- Eliminated **gluten**
- Increased **fruits and vegetables**
- Underwent a **stress reduction program**
- **Increased sleep** from 4 to 5 hours to 7 to 8 hours per night
- Took melatonin 0.5 mg at bedtime
- Took methyl-cobalamin, **vitamin B12** 1000 µg daily
- Took **vitamin D3** 2000 IU daily
- Took docosahexaenoic (DHA) acid and eicosapentaenoic (EPA) acid 1000 mg daily
- Took CoQ10 200 mg daily
- Practiced **oral hygiene**: electric flosser and toothbrush
- Reinstated appropriate **hormone replacement** therapy
- Had 12-hour **intermittent fast** between dinner and breakfast
- Had a minimum of 3 hours between dinner and bedtime
- **Exercised** at least 30 minutes for 4 to 6 times per week

# BREDESEN'S FIRST SUCCESS STORY

- **Began System 1.0 (now 3.0) adhered to *some* of the protocol components.**
- **Nonetheless, after three months all symptoms abated**
  - **Navigate without problems**
  - **Remember telephone numbers without difficulty**
  - **Prepare reports and do all of her work without difficulty**
  - **Read and retain information**
  - **She became asymptomatic - memory better than it had been in many years.**
- **On one occasion, she developed an viral URI, discontinued the program, and noticed a decline, which reversed when she reinstated the program.**
- **Now age 70, she remains asymptomatic and works full-time.**



# BREDESEN'S SECOND SUCCESS STORY

- **69-year-old entrepreneur and professional man**
- **11 years of slowly progressive memory loss**
- **Accelerated over the past one or two years**
- **At 58, unable to recall the combination of the lock on his locker**
- **FDG-PET scan - pattern typical for early Alzheimer's disease**
  - **Reduced glucose utilization in the parietotemporal cortices bilaterally**
  - **Left > right temporal lobes, but preserved utilization in the frontal lobes, occipital cortices, and basal ganglia**



# BREDESEN'S SECOND SUCCESS STORY

- **Quantitative neuropsychological testing**
  - Reduction in CVLT (California Verbal Learning Test) from 84%ile to 1%ile
  - Stroop color test at 16%ile
  - Auditory delayed memory at 13%ile
- **Heterozygous for ApoE4 (3/4)**
- **Progressive difficulty recognizing faces at work (prosopagnosia)**
- **Had to have his assistants prompt him with the daily schedule**
- **Several chapters into a book before realizing he read it previously**
- **Lost ability to add columns of numbers rapidly in his head**



# BREDESEN'S SECOND SUCCESS STORY

- **Began the therapeutic program**
- **After six months, his wife, co-workers, and he noted Improvement**
- **Lost 10 pounds**
- **Again able to recognize faces at work**
- **Able to remember his daily schedule**
- **Able to function at work without difficulty**
- **Quicker with his responses**
- **Life-long ability to add columns of numbers rapidly in his head returned**
- **Clear cognitive improvement, but, amazingly, accelerating decline over the prior year or two completely halted**



# ANOTHER SUCCESS STORY

- Patient with well-documented **mild cognitive impairment** (MCI)
- Presented with **a strongly positive** amyloid-PET (positron emission tomography) scan
- **Positive** fluorodeoxyglucose PET scan
- **Abnormal** neuropsychological testing
- **Reduced** hippocampal volume in the **17th percentile**
- Then, **followed** Dr Bredesen's metabolic enhancement for neurodegeneration protocol for **10 months**
- Subsequently, the patient experienced **an increase** from the **17th percentile** to the **75th percentile**, with a **11.7% absolute increase** in hippocampal volume

# ADDITIONAL SUCCESS STORY

- Patient was told his AD was **incurable**
- After experiencing 3 years of significant **cognitive decline**, he had lost all hope, which led to **depression**
- His wife chose not to “deny the diagnosis” but rather to embrace it and to “defy the verdict”
- She discovered the Bredesen Protocol
- Prior to starting the protocol in June 2017, the patient was **unable to score even 1 point** on the Montreal Cognitive Assessment test
- Six months later, on December 31, 2017, he was able to **score 9 out of 30**
- More important, after 3 years of significant cognitive decline, his functional capacity to participate in regular, everyday activities **improved dramatically**
- He specifically regained the ability to **tie his shoes** and **dress himself** appropriately

# ADDITIONAL SUCCESS STORY

- Became able to **participate in social activities** with his wife
- Could again **engage in conversations** with others without getting flustered
- Restored **ability to cook and grill** vegetables without burning the food or making a mess
- Again, can **mow the lawn** without any missed areas
- Go shopping **without getting lost** in the store
- Can use the microwave **without instructions**, whereas previously, he had not been able to microwave even with instructions
- He now enjoys the ability **to control his life** and is pleased with his ability to contribute around the home and be a loving husband to his wife who would not allow him to give up

**COGNOSCOPY**

# HOMOCYSTEINE

- Indicator of inflammation AND loss of synapse support
- **Optimal Level: <7.0 umol/L**
- Essential Action(s):
  - Bring **vitamin B12 (cobalamin)** to at least 500pg/ml, but, ideally, to 1500 pg/ml – use methyl-cobalamin (B12) to do it.
  - Bring **vitamin B9 (folate)** to at least 10 ng/ml, but, ideally, to 25 pg/ml – use methyl-folate to do it.
  - Bring **vitamin B6 (pyridoxine)** to at least 60 mcg/L, but, ideally, to 100 mcg/L – use pyridoxal-5-phosphate (P5P) to do it.

# HOMOCYSTEINE

- **Supplementation:**
  - **Pyridoxal-5-phosphate (P5P) form of B6: 20 – 50 mg/day**
  - **Methylcobalamin (methyl-B12): 1000 mcg/day – chew it**
  - **Adenosylcobalamin: 1000 mcg/day**
  - **Methyl-folate form of folate: start with 0.4 to 0.8 mg/day (and as high as 5 mg/day)**
  - **Recheck homocysteine (Hcy) in 3 months – if still > 6.0, add 500 mg of glycine betaine (trimethyl glycine) in capsule form**
  - **Recheck Hcy in 3 months – if still > 6.0, reduce methionine in the diet, namely, leave off nuts, beef, lamb, cheese, turkey, pork, fish, shellfish, soy, eggs, and dairy (including sheep's and goat's milk)**



Since **KAL** 1932  
INNOVATIVE QUALITY

Free of  
Gluten  
&  
Soy

**B-12**  
Methylcobalamin &  
Adenosylcobalamin  
2000 mcg

DIETARY SUPPLEMENT

1  
Daily



**ActivMelt**  
INSTANT DISSOLVE

Mixed Berry Natural Flavor

60 MICRO TABLETS



**Jarrow.**  
FORMULAS

**Methyl | Methyl  
B-12 & Folate**

**1000 mcg**

**400 mcg**

**+ P-5-P (B<sub>6</sub>)**

**100  
LOZENGES**

**DIETARY  
SUPPLEMENT**



lemon flavor



... per day  
... occasional.  
... pregnant,  
... 18, or  
... occasional  
... Plus  
... combines  
... (CN) and  
... metabolism.\*  
... methylfolate  
... enzymes.\*  
... Food  
...  
... FORMULAS®  
...  
... 1000-4217  
... FORMULAS®  
... 18 / 20

**Sup**  
Serving Size  
Serving Per Container  
Vitamin B12  
Folate (as  
(5S- & Methyl  
Vitamin B6  
% Daily Value  
Other ingredients  
source, may  
(vegetarian)  
No wheat  
or peanuts  
Suitable for



**Jarrow**  
FORMULAS

Methyl Methyl  
**B-12 & Folate**

**5000**  
MICROGRAMS

**800**  
MICROGRAMS

Plus  
**P-5-P**  
(Vitamin B<sub>6</sub>)

Energy Production  
and Brain Function\*



CHERRY  
FLAVOR

60 CHEWABLE  
TABLETS 

DIETARY  
SUPPLEMENT

# INSULIN RESISTANCE

- High insulin and high glucose are **two of the most important risk factors** for Alzheimer's disease.
- Insulin-degrading Enzyme (IDE) – **degrades BOTH insulin and amyloid-beta**. Therefore, high insulin levels can lead to higher amyloid-beta levels.
- Chronically high glucose levels can lead to **glucose attaching to proteins**, called advanced glycation end-products (AGEs)
  - Look different to the immune system – may **trigger antibodies against your own proteins**, leading to inflammation
  - AGEs **bind to their own receptor** (RAGE), triggering inflammation
  - AGEs **cause free radicals**, which can damage DNA and cell membranes
  - AGEs **damage blood vessels**, reducing nutrition to the brain and causing the blood-brain barrier to leak

# INSULIN RESISTANCE

- **Optimal Levels:**
  - **Fasting Insulin - <5 microlU/ml**
  - **Hemoglobin A1c - <5.7 %**
  - **Fasting Glucose – 70-90 mg/dL**

# INFLAMMATION

- **There is a direct mechanistic link between inflammation and Alzheimer's**
- **Chronic inflammation can lead to heart attack, stroke, cancer, osteoarthritis, accelerated aging, and Alzheimer's**
- **Viruses, bacteria, fungi, AGEs, and oxidized LDL cholesterol can all stimulate inflammation**
- **There are several measures of inflammation: hsCRP, albumin to globulin ratio (A/G ratio), omega-6:omega-3 ratio**

# INFLAMMATION

- **Optimal Levels:**
  - **Hs-CRP - <0.9 mg/dL**
  - **Albumin - > or = 4.5 g/dL**
  - **Albumin/Globulin Ratio - A/G - > or = 1.8**
  - **Omega-6:Omega-3 – 0.5 – 3.0**

# PLANT SOURCES OF OMEGA-3 ESSENTIAL FATTY ACIDS

- Chia Seeds – 5000 mg of ALA/1 oz
- Walnuts – 2750 mg of ALA/1 oz
- Flaxseed – 2350 mg of ALA/Tb
- Edamame – 555 mg of ALA/1 cup
- Spinach (315 mcg), Broccoli (94 mcg), green peas (39 mcg), & raw Brussels sprouts (39 mcg) of ALA per 3 ½ oz serving
- Perilla Oil – 9000 mg of ALA/1 Tb
- Algal Oil – 400 mg to 500 mg of DHA & EPA per supplement

<https://fdc.nal.usda.gov/>

# HORMONAL STATUS

- Many hormones contribute crucially to optimal cognitive function: thyroid, estrogens, progesterone, testosterone, DHEA
  - Support synapse formation and maintenance
  - Prevent synapse elimination
- Estrogen binds to its receptor and activates alpha secretase (ADAM10), which splits APP into two brain enhancing pieces, rather than the four brain degrading ones
- Men in the lowest quintile of testosterone are at increased risk of Alzheimer's
- Pregnenolone is the master steroid from which estradiol, testosterone, cortisol, and DHEA are derived. Thus, if stress levels are high, sex hormone levels may drop

# HORMONAL STATUS

- **Optimal Levels:**
  - hsTSH - <2.0 microIU/ml
  - Free T4 – 1.3 – 1.8 ng/dL
  - Estradiol – 50 – 250 pg/ml
  - Progesterone – 1 – 20 ng/ml
  - Estradiol:Progesterone Ratio – 10-100
- Total Testosterone – 500 – 1000 ng/dL
- Free Testosterone – 6.5 – 15 ng/dL
- AM Cortisol – 10 – 18 mcg/dL
- Pregnenolone – 50 – 100 ng/dL
- DHEA – 350 – 430 mcg/dL (women); 400 – 500 mcg/dL (men)

# HORMONAL STATUS

- **Supplementation:**
  - **Pregnenolone – 10 mg – 25 mg/day**

# METAL DETECTION

- Too much copper and too little zinc are associated with dementia
- Proton pump inhibitors lead to poor zinc absorption
- Aging is associated with lower zinc levels
- Patients with the toxic subtype of Alzheimer's (type 3) often have very low zinc levels, half those of healthy people
- Low zinc levels leave patients more sensitive to mercury and mold toxins (mycotoxins)
- Zinc is critical for insulin synthesis, storage, and release

# TOO MUCH COPPER?

- **Supplements:**
  - Zinc Picolinate – 25 mg – 50 mg/day
  - Alpha-lipoic acid – 30 mg – 60 mg/day
  - Vitamin C – 1 gm – 3 gm/day
  - Pyridoxine (B6) – 100 mg/day
- **Avoid vitamins with copper**

# METAL DETECTION

- Magnesium for brain function
- In Alzheimer's, the hippocampus is usually magnesium deficient
- Adding magnesium to the diet is usually essential for optimal brain function
- Optimal Level:
  - RBC Magnesium – 5.2 – 6.5 mg/dL

# METAL DETECTION

- **Selenium is used to build glutathione**
- **Low levels of glutathione contribute to inflammation, toxicity, and loss of support for synapses**
- **Selenium regenerates glutathione**
- **Optimal Level:**
  - **Selenium – 110 – 150 ng/ml**
  - **Glutathione (GSH) – 5.0 – 5.5 umol/L**
- **Food Sources:**
  - **Selenium – Brazilnuts, flaxseeds, sunflower seeds, 100% whole wheat**
  - **Glutathione - parsley, spinach, cabbage, garlic, brussels sprouts, beets, avocado, and broccoli help boost it**

# METAL DETECTION

- Heavy metals, like mercury, are neurotoxic
- Some fish have high levels of mercury – the larger the fish the higher the levels
- Dental amalgams is another potential source
- Mercury can induce signature pathology of Alzheimer's disease
- Optimal Level:
  - Mercury - < 50 percentile by Quicksilver
  - Mercury - < 5 mcg/L by standard lab

# METAL DETECTION

- Arsenic can also adversely affect brain function
- Arsenic can contaminate ground water in the western US
- Arsenic is present in chicken
- Arsenic can impair executive function (problem solving, planning, organizing), mental acuity, & verbal skills – deficits of type 3 AD
- Optimal Level:
  - Arsenic - < 50 percentile by Quicksilver
  - Arsenic - < 7 mcg/L

# METAL DETECTION

- **Lead impairs cognitive function**
- **Leads to lower IQs in exposed children**
- **Lead exposure – old paint & dust in cities – increases amyloid formation later in life**
- **Optimal Level:**
  - **Lead - < 50 percentile by Quicksilver**
  - **Lead - < 2 mcg/L**

# METAL DETECTION

- **Cadmium acts with lead and arsenic to enhance Alzheimer's changes in the brains of rodents**
- **Cadmium exposure comes from cigarette smoking, working in chemical factories, exposure to paints, especially brilliant yellows and reds**
- **Optimal Level:**
  - **Cadmium - < 50 percentile by Quicksilver**
  - **Cadmium - < 2.5 mcg/L**

# SLEEP APNEA

- **Sleep apnea is common, usually goes undiagnosed, and contributes to cognitive decline**
- **Sleep is one of the most power weapons against AD**
  - Space between brain cells expands, allowing more calcium & magnesium ions to flow past, flushing out debris, like amyloid
- **Reduced formation of amyloid**
- **Fasting improves insulin sensitivity**
- **Autophagy activated, recycling damaged mitochondria & misfolded proteins, et cetera**
- **A time of repair – growth hormone (GH) increases, repairing cells, & producing new supportive brain cells**
- **Optimal Goal (+/- CPAP):**
  - **AHI (apnea-hypopnea index) – fewer than 5 events per hour – preferably 0**

# CHOLESTEROL

- **Damaged cholesterol is toxic to the blood vessels**
- **Vascular (blood vessel) disease is a contributor to cognitive decline**
  - **Raises risk of Alzheimer's disease**
  - **Causes vascular dementia – typically associated with many small strokes**
- **Optimal Goals:**
  - **Oxidized LDL - < 60 U/I**
  - **sdLDL (small dense LDL) - < 20 mg/dL or 20% of LDL**
  - **Total Cholesterol – 140 – 170 mg/dL**

# VITAMIN E

- **Vitamin E is an important protector of your cell membranes – protects fatty cell membranes from free radicals**
- **Antioxidant with an anti-Alzheimer's effect**
- **A family of compounds: tocopherols and tocotrienols**
- **Optimal Goals:**
  - **Vitamin E – (alpha-tocopherol) – 13 – 20 mcg/ml**
- **Supplementation:**
  - **Vitamin E as mixed tocopherols & tocotrienols – 400 – 800 IU, if level < 13**

# VITAMIN B1 (THIAMINE)

- B1 is critical for memory formation
- Thiamine is degraded by tea, coffee, and alcohol
- Optimal Goals:
  - Vitamin B1 – 20 – 30 nmol/L
- Food Sources:
  - Top sources – nutritional yeast, sunflower seeds, sesame seeds, oats, chia seeds, flaxseeds, & 100% whole grains

# “LEAKY GUT”

- Cells that line the intestinal tract maintain tight junctions (a protein complex with occluding acts as glue between cells)
- **These tight junctions can be damaged by gluten, pesticides, soft drinks, alcohol, sugar, processed foods, preservatives, stress, aspirin, Tylenol**
- **Lab Test Goal:**
  - Cyrex Array 2 – negative (measures antibodies to zonulin/occludin, indicating leaky gut)
  - Cyrex Array 3 & 4 – test for food sensitivities, which can “leaky gut”
- **Triggers to Avoid:**
  - Sugar, gluten (if sensitive), artificial sweeteners, preservatives, dyes, glyphosate, pesticides, GMO, alcohol, antibiotics, NSAIDS, ASA
- **Supplements:**
  - L-glutamine, prebiotics (onions, leeks, garlic), probiotics (L. plantarum, L. acidophilus, L. brevis, B. lactis, B. longum)

# BLOOD-BRAIN BARRIER

- A growing list of disease-causing bacteria, viruses, fungi, and other microbes have turned up in the brains of patients with Alzheimer's
- Low levels of pathogens is like a cold war, a slow wearing down and suboptimal brain functioning
- Know the status of your BBB
- Lab Test Goal:
  - Cyrex Array 20 (measures the response to leaked BBB proteins) – negative

# GLUTEN SENSITIVITY

- Only 5% of people develop celiac disease, which is severe gluten intolerance
- However, many people may suffer damage to their intestinal tract, especially tight junctions between cells, from gluten
- Lifestyle Change:
  - May consider switching to only 100% organic whole grains
  - Otherwise, choose low glycemic gluten-free grains
- Lab Test Goal:
  - Tissue transglutaminase antibodies – negative
  - Cyrex Array 3 and 4 – negative

# MYCOTOXINS

- **Alzheimer's type 3 – can be caused by mycotoxins from mold, namely, Stachybotrys, Aspergillus, Penicillium, and Chaetomium.**
- **Lab Test Goal:**
  - C4a < 2830 ng/ml
  - TGF- $\beta$ 1 < 2380 pg/ml
  - MSH – 35 – 81 pg/ml
  - HLA-DR/DQ – no CIRS propensity
  - Urinary Mycotoxins – negative for trichothecenes, ochratoxin A, aflatoxin, and gliotoxins

# BIOTOXINS

- **Treatments for Biotoxins:**
  - **IV glutathione or liposomal glutathione**
  - **Eat cilantro, cauliflower, broccoli, cabbage, kale, radishes, Brussels sprouts, turnips, watercress, kohlrabi, rutabaga, arugula, horseradish, maca, bok choy, avocados, artichokes, beets, garlic, ginger, grapefruit, lemons, olives**
  - **Spend more time outdoors**
  - **HEPA filter – IQAir is one option**
  - **Read *Surviving Mold*, by Dr. Ritchie Shoemaker**
  - **Shoemaker protocol**

# OTHER TOXINS

- **Detoxification may be the most difficult part of the Reversal of Cognitive Decline (ReCODE) program, since there are so many toxins that contribute to cognitive decline**

- **Risk Factors:**

- **Hx of general anesthesia, eat fish (esp. tuna, swordfish, shark), exposure to mold (home, car, work), eat processed or non-organic foods, hx of tick bites, take medications and/or PPIs, drink alcohol, use makeup, hair spray, and/or antiperspirant, how often do you sweat, constipation, drink less than 32 oz of purified water daily**

# MITOCHONDRIAL DYSFUNCTION

- **Mitochondrial damage is associated with cognitive decline**
- **Toxins to Avoid:**
  - **Statins, alcohol, L-DOPA, griseofulvin, Tylenol, NSAIDS, cocaine, methamphetamine, AZT**

# BMI (BODY MASS INDEX)

- **Unhealthy BMI raises risk for cognitive decline**
- **Goal:**
  - BMI – 18 – 24
  - Waistline - < 35 inches (women)
  - Waistline - < 40 inches (men)

# GENETICS

- **ApoE4 – strongest risk factor for Alzheimer’s for those on the SAD diet – heterozygous (one gene) risk of 47% and homozygous (two genes) risk of 91%**
- **Lab Testing:**
  - **23andMe – evaluates ApoE status, if test for late-onset Alzheimer’s disease is ordered**

# COGNITIVE TESTING

- **Know where you stand with your memory – MoCA (Montreal Cognitive Assessment) is the simplest test**
- **Testing Results:**
  - Normal – 26 – 30
  - MCI (Mild Cognitive Impairment) – 19 – 25
  - Dementia – MCI and difficulties with ADLs - 19 – 22
  - Dementia - < 19
  - AD – average score is 16.2

# IMAGING

- **Brain imaging can show which regions have shrunk and which are using less energy (are less active)**

- **Testing Options/Targets:**

- MRI with volumetrics\* – normal brain imaging and normal volumetrics, showing no areas of atrophy
- FDG-PET (18F-fluorodeoxyglucose) – negative scan, showing no areas of decreased brain activity
- Amyloid PET – negative scan
- EEG – no seizure activity or slowing

\*Assessed by Neuroreader and NeuroQuant

# WHAT IS SYSTEM 3.0?

- Minimize inflammation (i.e., WFPB diet, leave off flesh foods & processed food)
- Minimize insulin resistance - (i.e., lower insulin with low GI diet)
- Enhance autophagy - (i.e., remove amyloid-beta with 12-16 hour daily fast)
- Ketogenesis – 12-16 hour daily fast; nothing between meals except water;
- Reduction of cortisol, corticotropin-releasing hormone (CRF), and stress axis – Christian meditation, aerobic exercise, classical, sacred, or instrumental music (without rock instruments, beat, or rhythm), diaphragmatic breathing
- Optimize sleep – 7-8 hours; exclude sleep apnea (e.g., STOP-BANG); Sleep hygiene
- Exercise – aerobic and strength, 30-60 minutes, 5-6 times a week; ramp up slowly; protect your heart (i.e., zero tolerance for chest pain);



# WHAT IS SYSTEM 3.0?

- **Brain stimulation (i.e., a new language, a musical instrument, new hobby, etc.)**
- **Homocysteine <7 (i.e., B12, dark green leafy vegetables & beans)**
- **Vitamin B12 >500**
- **hsCRP <1.0; albumin/globulin (A/G) >1.5**
- **Fasting insulin <7; HgbA1c <5.5**
- **Hormone balance (i.e., freeT3, freeT4, E2, testosterone, progesterone, pregnenolone, cortisol)**



# WHAT IS SYSTEM 3.0?

- **Prebiotics** - fructo-oligosaccharides (FOS), galacto-oligosaccharides (GOS), resistant starches, pectic oligosaccharides (POS), inulin, non-carbohydrate oligosaccharides, polyphenols, & some fatty acids (i.e., Chicory root, Dandelion greens, Jerusalem artichoke, garlic, onions, leeks, asparagus, bananas)
- **Probiotics**
- Reduction of A-beta (i.e., Curcumin, Ashwagandha)
- Cognitive enhancement (i.e., Bacopa monniera, Mg)
- Vitamins D3, K2 (i.e., 25OH-D3 – 50-100ng/ml)
- Increase nerve growth factor (i.e., H. erinaceus or ALCAR (NR))
- Provide synaptic structural components (i.e., Citicoline, DHA)

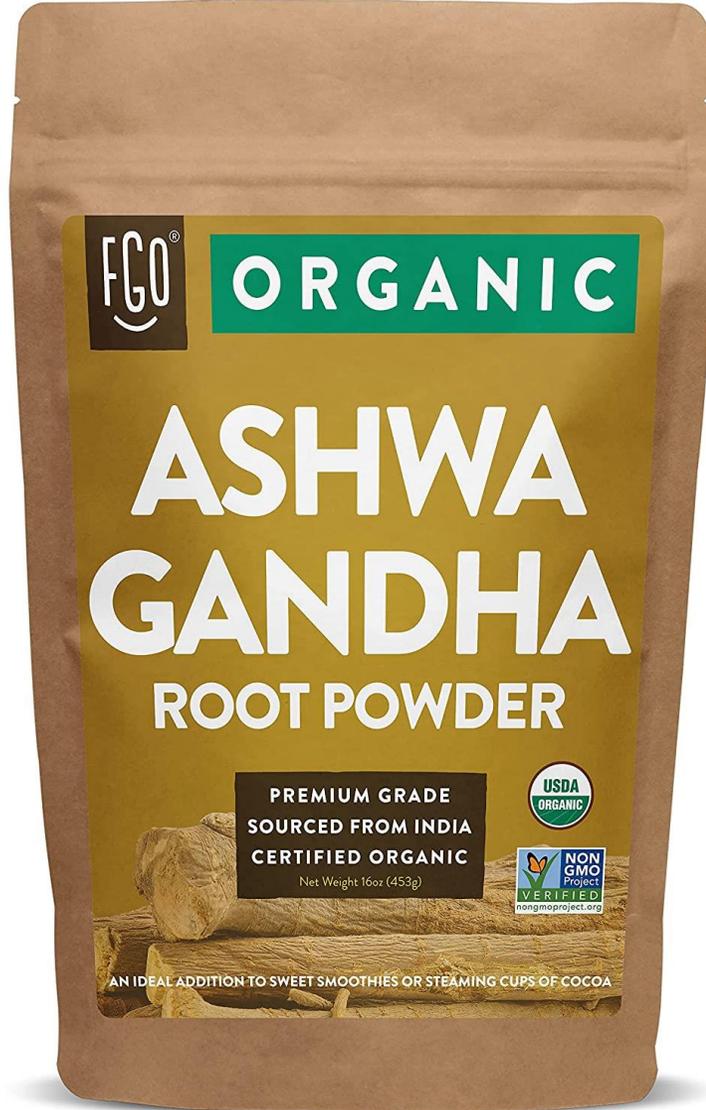


# WHAT IS SYSTEM 3.0?

- **Optimize antioxidants (see handout on [drnewstart.com](http://drnewstart.com))**
- **Optimize Zn:fCu ratio to 1:1**
- **Ensure nocturnal oxygenation (i.e., screen for OSAHS & treat)**
- **Optimize mitochondrial function (i.e., CoQ or ubiquinol,  $\alpha$ -lipoic acid, PQQ, NAC, ALCAR, Se, Zn, resveratrol, ascorbate, thiamine)**
- **Increase focus (i.e., Pantothenic acid)**
- **Increase SirT1 function (i.e., resveratrol)**
- **Exclude heavy metal toxicity (i.e., evaluate Hg, Pb, Cd; chelate if indicated)**
- **Medium chain fatty acid effects (i.e., Coconut or Axona)**



# **NEUROPROTECTIVE HERBS**



- ½ tsp/day
- Sharpens Focus and Memory
- Improvements in immediate & general memory tests
- Prevent Aβ fibril formation



# ASHWAGANDHA BENEFITS THE BRAIN

- Antioxidant activity - free radical scavenging activity
- Withanamides A and C uniquely bind to the active motif of Beta amyloid (A $\beta$ 25-35) and prevent fibril formation
- These compounds protected nerve progenitor cells and rodent neuronal cells from  $\beta$ -amyloid-induced cell death
- Treatment with withanolide A induced regeneration of axons and dendrites and restored the synapses (nerve connections) in cultured neurons (nerves)

# ASHWAGANDHA BENEFITS THE BRAIN

- Withanolide A inhibited Beta amyloid-induced ( $A\beta(25-35)$ ) degeneration of axons, dendrites, and synapses in the cerebral cortex and hippocampus
- Also this compound restored Beta amyloid-induced ( $A\beta$ -peptide) memory deficits in rodents
- Water extracts of ashwagandha increased acetylcholine (ACh) content and in rats
- Treatment with the root extract caused upregulation of the LDL receptor-related protein, which enhanced Beta amyloid ( $A\beta$ ) clearance and reversed the AD pathology in mice

# ASHWAGANDHA BENEFITS THE BRAIN

- 8 weeks of extract (300mg) twice a day compared with placebo, demonstrated significant improvements in both immediate and general memory tests compared to the placebo group.
- Furthermore, the treatment group showed significant improvement in executive function, sustained attention, and information-processing speed



- $\frac{1}{4}$  tsp/day
- Increases signaling molecules implicated in synaptogenesis
- Cognitive stimulation



# BRAHMI (BACOPA MONNIERI) BENEFITS THE BRAIN

- Bacopa phytochemicals have antioxidant and free radical scavenging action by blocking lipid oxidation in several areas of the brain
- After 125mg BID for 12 weeks, significant improvement was observed in mental control, logical memory, and paired association learning in Bacopa-treated patients compared to the placebo group at 8 and 12 weeks after initiation of the trial

# BRAHMI (BACOPA MONNIERI) BENEFITS THE BRAIN

- Improvement in the d2 concentration test score was seen with Bacopa alone only after repetitive dosing
- This may suggest that the long-term memory effects seen with repetitive dosing of Bacopa may be a promising therapeutic option for subjects suffering from MCI



- 1 tsp daily
- Inhibits formation of plaques and tangles
- Reduces astrocytosis and microgliosis
- Improves memory



- ¼ tsp/day
- Antianxiety
- Enhances or improve memory
- Improves blood flow
- Lowers release stress hormones
- Increases dopamine and serotonin levels



# GOTU KOLA BENEFITS THE BRAIN

- The high dose (750mg/day) of the plant extract enhanced working memory
- Improvements were also noted in self-rated mood following the Gk treatment
- This suggests the potential of Gk in mitigating age-associated decline in cognitive function and mood swings in the healthy elderly



- ½ tsp/day
- Reduce inflammation
- Decrease amyloid plaques
- Improve cognition
- Increase release of nerve growth factor



# LION'S MANE BENEFITS THE BRAIN

- In patients with MCI, a 16-week treatment with 3000 mg of Lm extract resulted in increased scores on the cognitive function scale in the experimental group compared to the placebo group
- In patients with mild AD, Lm extract improved scores on the activities of daily living (e.g., personal hygiene, dressing, preparing food, etc.) over 49 weeks



- ½ tsp/day
- Improves cognitive function
- Decreased beta-amyloid plaques
- Delayed degradation of neurons
- Metal-chelation
- Anti-inflammatory
- Antioxidant
- Decreased microglia formation



**OTHER  
NEUROPROTECTIVE  
NUTRIENTS**

**MAGNESIUM**







"How your food is produced does matter!"



Organic

# Hulled Barley

NET WT. 2 LBS. (906g)

GROWN BY FAMILY FARMERS



JUST AS NATURE INTENDED  
NO SALT, SUGAR OR  
PRESERVATIVES ADDED



**Bob's**  
**Red Mill**<sup>®</sup>



**ORGANIC**



**HARD RED SPRING**

**WHEAT BERRIES**

**PREMIUM QUALITY WHOLE GRAIN**

This High Protein Number 1 Dark Northern Hard Red Spring Wheat is some of the finest wheat available anywhere in the world! Whole grain wheat berries are very nutritious, containing 6 grams of protein, over 20 percent of your daily value for dietary fiber and 8 percent of your iron.



**NET WT 28 OZ (1 LB 12 OZ) 793g**

**Certified Organic by QAI**

Diets rich in whole grain foods and other plant foods low in total fat, saturated fat and cholesterol, may reduce the risk of heart disease and some cancers.



**keeps best refrigerated or frozen**

0221



**Bob's Red Mill**



**ORGANIC**



**WHOLE GRAIN**

**RYE BERRIES**

PREMIUM QUALITY WHOLE GRAIN

The peoples of Northern Europe and Russia use rye as their principle bread and cereal grain. Although rye has always been a minor grain in this country, with the current interest in whole grain eating, its use has been on the increase. Rye is rich in manganese, phosphorus, potassium and iron and is approximately 12% protein. The rye berries range from a golden hue to sage green. Often mistaken for moldy grains, the sage green color is unique to rye berries.

**NET WT 28 OZ (1 LB 12 OZ) 793g**

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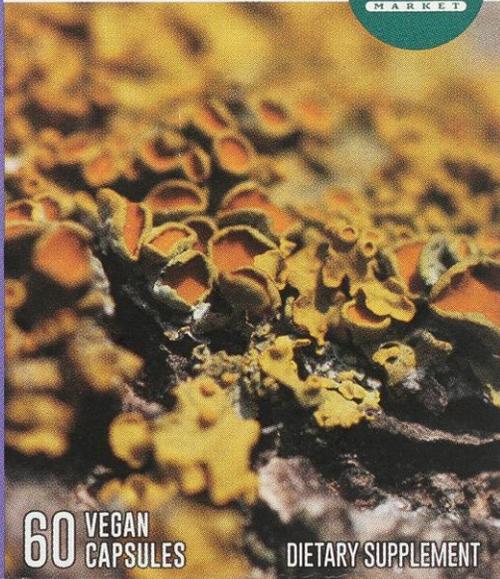
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EVERYDAY WELLNESS

FOOD-SOURCED  
**VITAMIN D<sub>3</sub>**

2000 IU Food-Sourced,  
Lanolin-Free Vitamin D<sub>3</sub>

Supports the Maintenance  
of Healthy, Strong Bones  
& Immune Function†



**60** VEGAN  
CAPSULES

DIETARY SUPPLEMENT

**CHOLINE**

# BENEFITS OF CHOLINE

- **Support synaptic growth and maintenance**
- **Acetyl choline is deficient in Alzheimer's**
- **Membranes of neurons are broken down to provide choline**
- **To prevent neuron break down, citicoline can be taken**
- **Choline-rich foods may also help to prevent neuron membrane degradation**







EDEN

ORGANIC  
GARBANZO  
BEANS

No Salt Added

USA  
GROWN

NON  
GMO  
VERIFIED

GLUTEN  
FREE

BPA  
BPS  
&  
PHTHALATES  
FREE  
LINING

NET WT 15 OZ  
425 g



== ORGANIC ==  
**GREEN LENTILS**

IT'S SIMPLE: NO SHORT-CUTS,  
JUST 100% COMMITMENT TO QUALITY AND  
**12G PROTEIN PER SERVING**



U PARVE



NET WT 16 OZ (1 LB) 453g

Enlarged to  
Show Texture



A GOOD SOURCE OF FIBER

ORGANICALLY GROWN  
No preservatives

simple truth  
organic™

LENTILS



SERVING SUGGESTION



NET WT 15 OZ (425g)



UNSWEET

ORGANIC SOY

8G  
PROTEIN  
PER SERVING

Silk

SOYMILK  
32 FL OZ



For entrées,  
salads & desserts



**MORI-NU<sup>®</sup>**  
— Silken —  
**TOFU**  
**FIRM**



**NET WT 12.3 OZ (349 g)**

**PREMIUM GRADE  
WHEAT GERM RAW  
CERTIFIED ORGANIC  
GOLDEN HIGH FIBER**

Net Weight 250gm

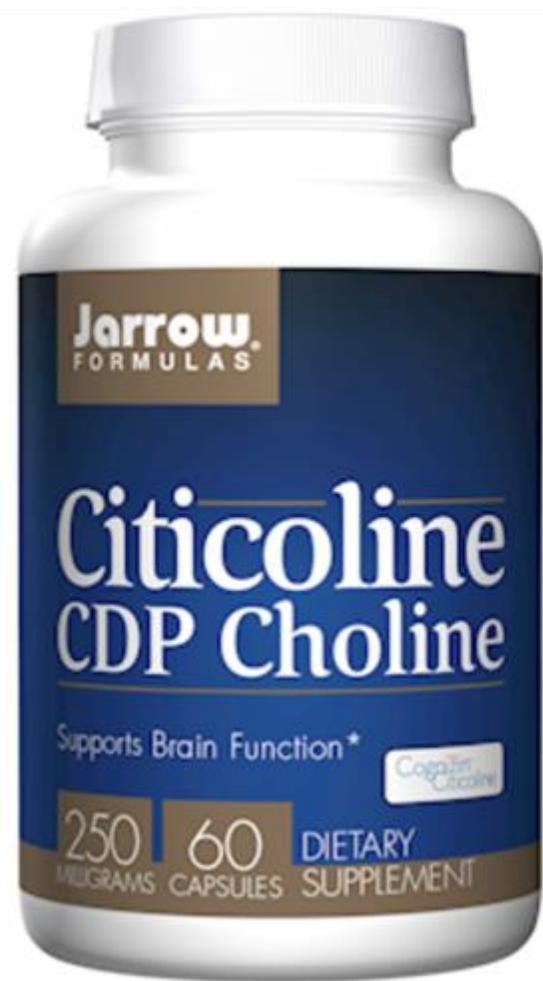
Store in cool, dry place.  
Refrigerate for freshness  
Product of USA.



Recommended Usage : No cooking required. Add to beverage & serve.

NUTRITIONAL INFORMATION			
Serving size 1 tbsp (15.0g)	Total Fat 0.5g	1%	Calcium 2%
Amounts per serving	Total Carbohydrates 10.0g	3%	Iron 10%
Calories 50	Dietary Fiber 2.0g	8%	*Based on 2,000 calorie diet.
0% Daily value*	Protein 3.0g		





**Jarrow**  
FORMULAS

# Citicoline CDP Choline

Supports Brain Function\*

Cognizin  
Choline

250

MILLIGRAMS

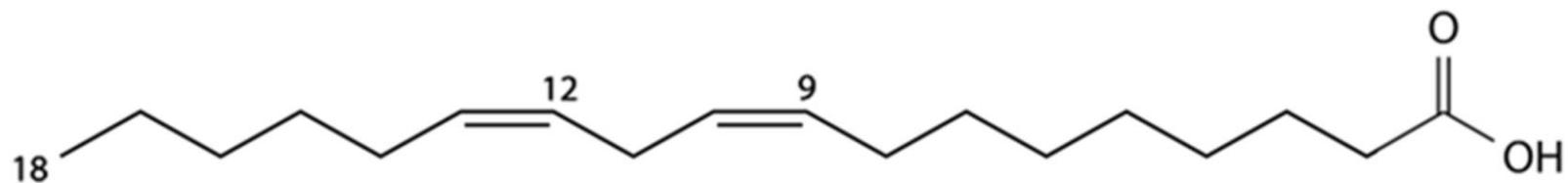
60

CAPSULES

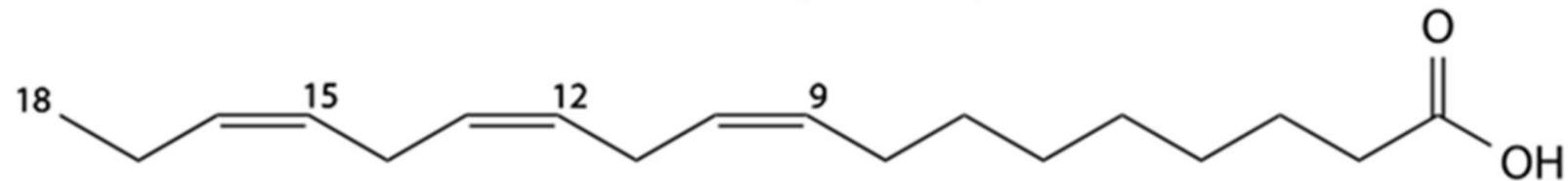
DIETARY

SUPPLEMENT

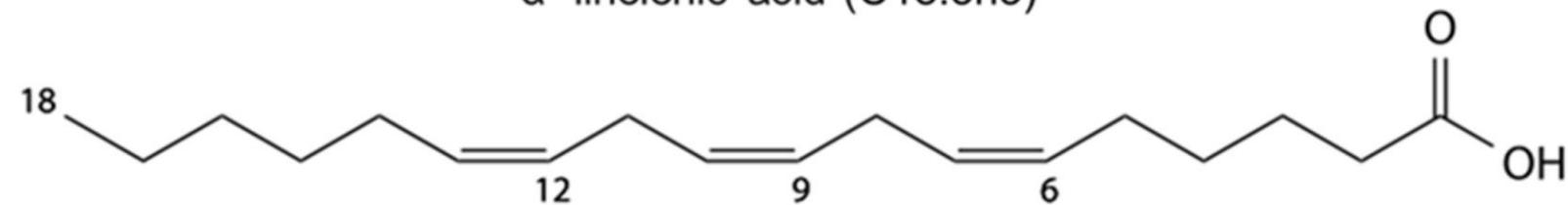
# ESSENTIAL FATTY ACIDS



Linoleic acid (C18:2n6)



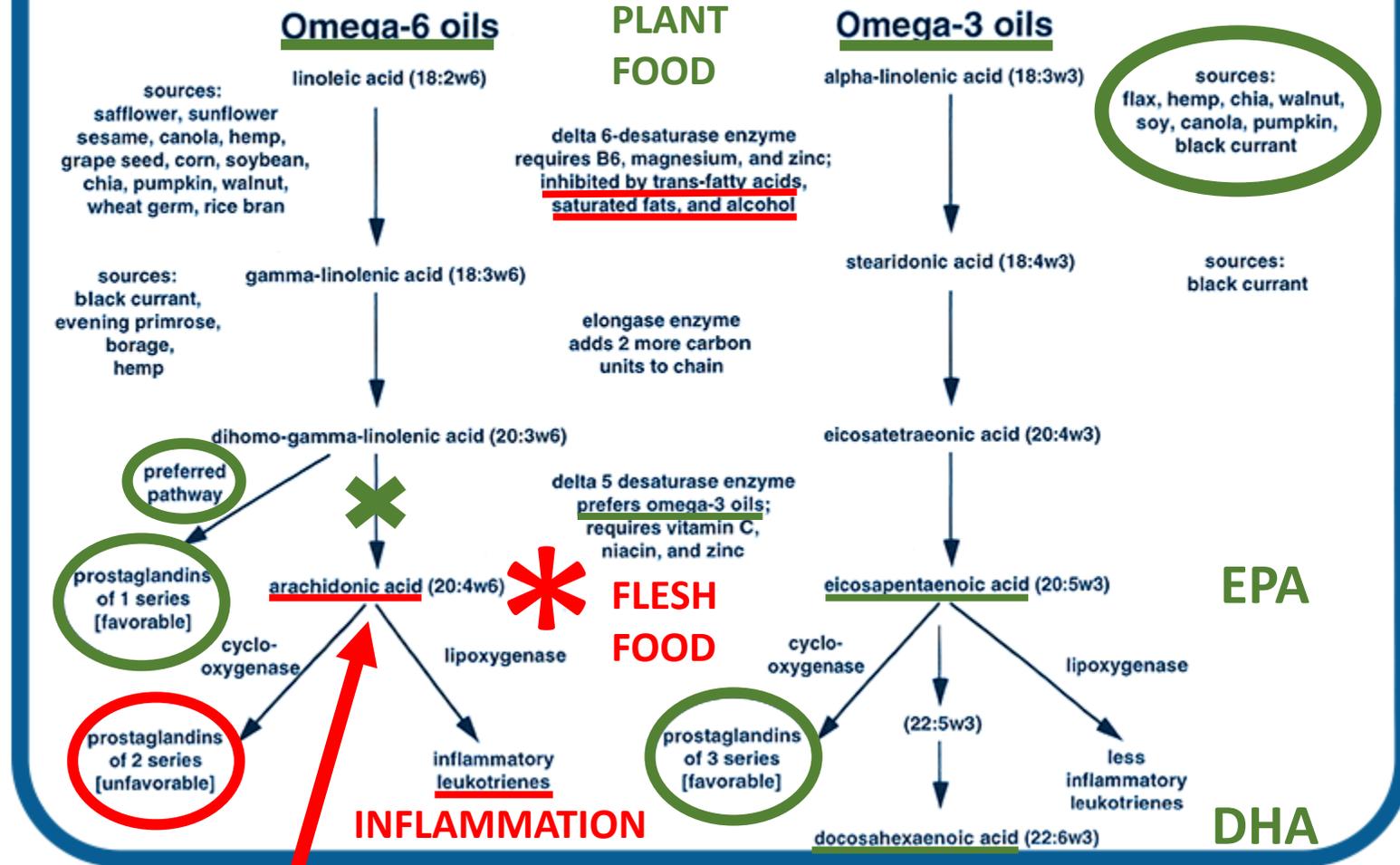
$\alpha$ -linolenic acid (C18:3n3)



$\gamma$ -linolenic acid (C18:3n6)

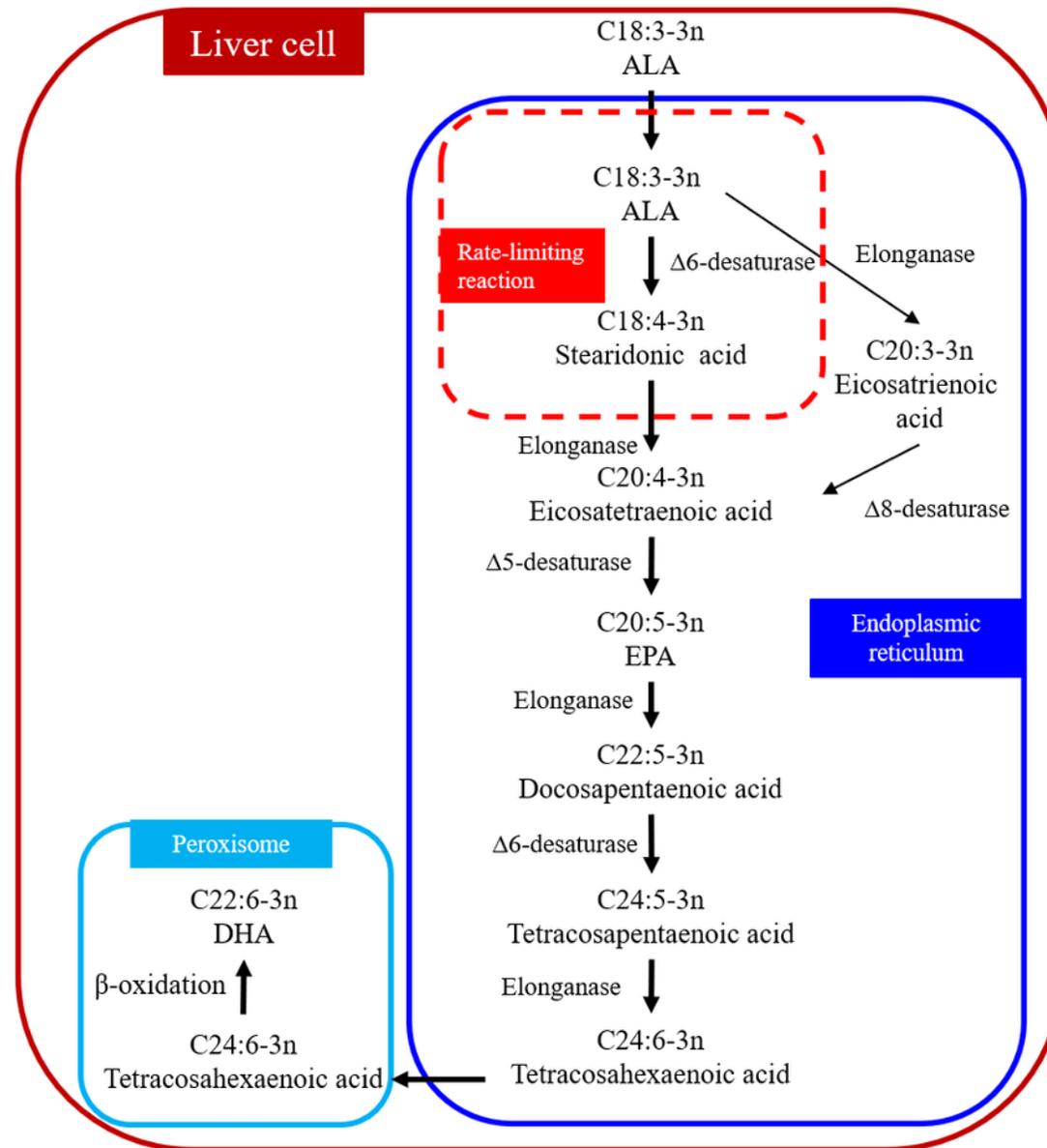
# ESSENTIAL FATTY ACIDS

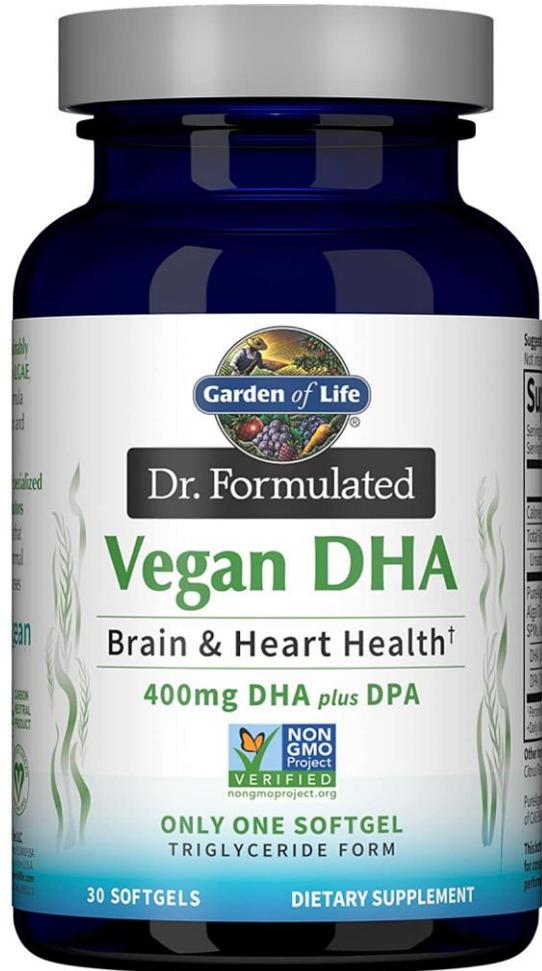
## ESSENTIAL FATTY ACID PATHWAYS



**Sources:**  
sardines, salmon, eggs, chicken, pork, beef

Adapted from graphic of *The Protein Foods & Nutrition Development Association of India (PFNDAI)*





Dr. Formulated

# Vegan DHA

Brain & Heart Health<sup>†</sup>

400mg DHA plus DPA



ONLY ONE SOFTGEL  
TRIGLYCERIDE FORM

30 SOFTGELS

DIETARY SUPPLEMENT

Tear Here To Open

Resealable Package

An Employee-Owned Company

Bob's  
Red Mill®

To Your  
Good Health®  
*Bob Moore*



PREMIUM

Whole Ground

FLAXSEED  
MEAL

YOU CAN SEE OUR QUALITY



NET WT 16 OZ (1 LB) 453g







APPROX. 12 CUPS

ITM. / ART. 36285

**KIRKLAND**  
*Signature*

# WALNUTS

US #1 20% HALVES WITH PIECES

NET WT. 1.36kg (48 OZ) 3 LB



ITM. / ART. 36285  
0 96619 36285 1

← Resealable Package

Tear Here To Open →

An Employee-Owned Company

**Bob's**  
**Red Mill**<sup>®</sup>

To Your  
Good Health<sup>®</sup>  
*Bob Moore*



ORGANIC

Whole

**CHIA SEEDS**

YOU CAN SEE OUR QUALITY<sup>®</sup>



NET WT 12 OZ (3/4 LB) 340g

**COPPER**







ZINC









MORI-NU®

silken  
**TOFU**

**EXTRA FIRM**



HEART HEALTHY  
Certified



Gluten-Free



PARVE



NO PRESERVATIVES



FOR STIR FRY AND SAUTÉING

NET WT 12.3 OZ (349g)

COQ10

# COQ10

- **Support mitochondrial function**

## Highest Vegetable Sources

	<u>Type</u>	<u>mg of CoQ10 per 100 g</u>
1.	soybeans, raw	1.87
2.	soybeans, boiled	1.21
3.	parsley	0.75
4.	soybeans, dry	0.68
5.	broccoli	0.59
7.	natto (fermented soybeans)	0.56
8.	sorrel (spinach dock, narrow-leaved dock)	0.36
9.	Japanese radish leaves	0.33
10.	sweet potato	0.33



  
**VITAL**  
NUTRIENTS

**Ubiquinol CoQ10**  
**100mg**

**DIETARY SUPPLEMENT**  
**60 VEGETARIAN SOFTGELS**

# ALPHA LIPOIC ACID

# ALPHA LIPOIC ACID

- **Powerful antioxidant**
- **Highest foods sources: spinach, broccoli, tomato, green peas, Brussel sprouts, brown rice**

**Powerful antioxidant!**

**PYRROLOQUINOLINE**  
**QUINONE**

**Increases mitochondrial  
number!**









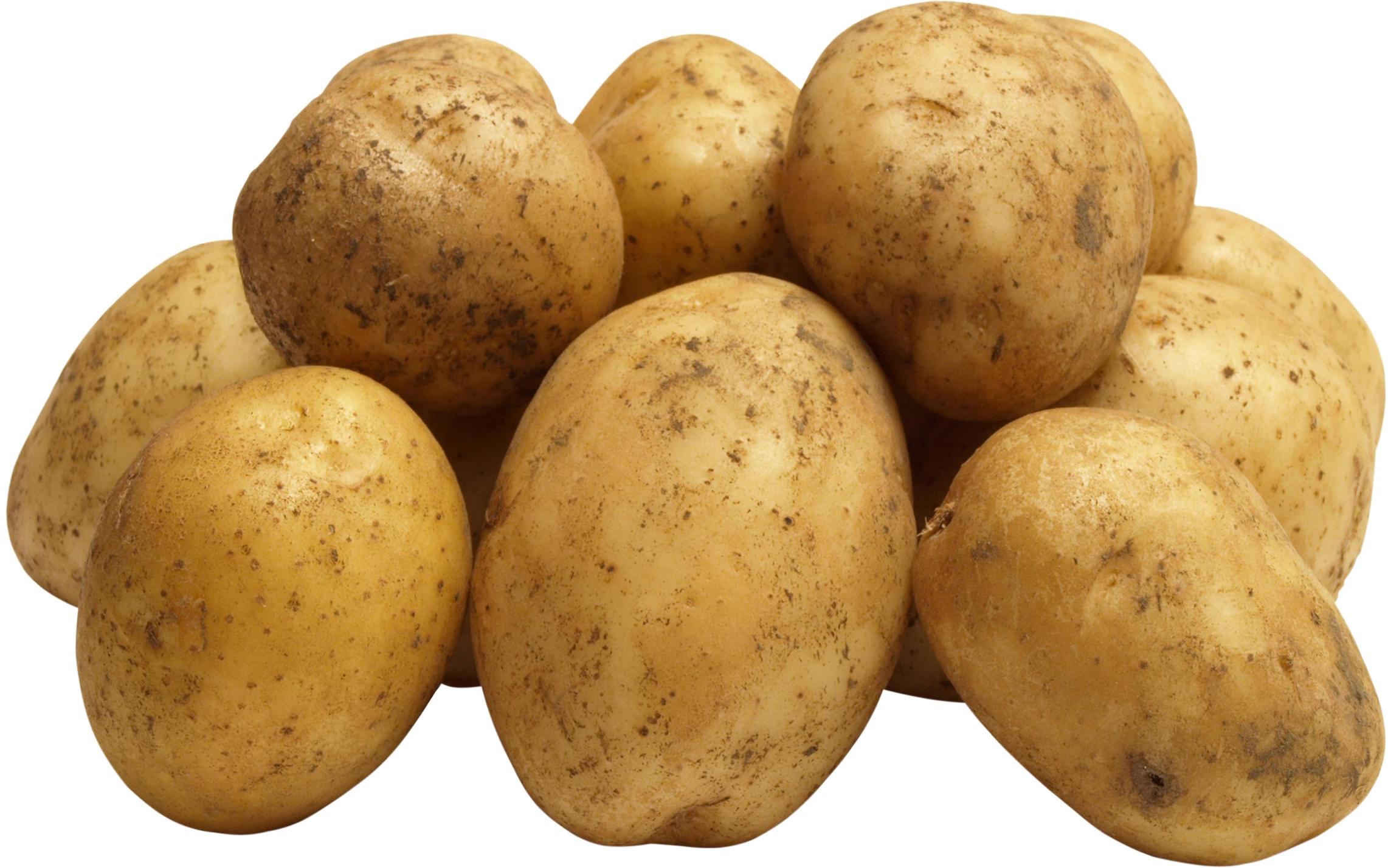












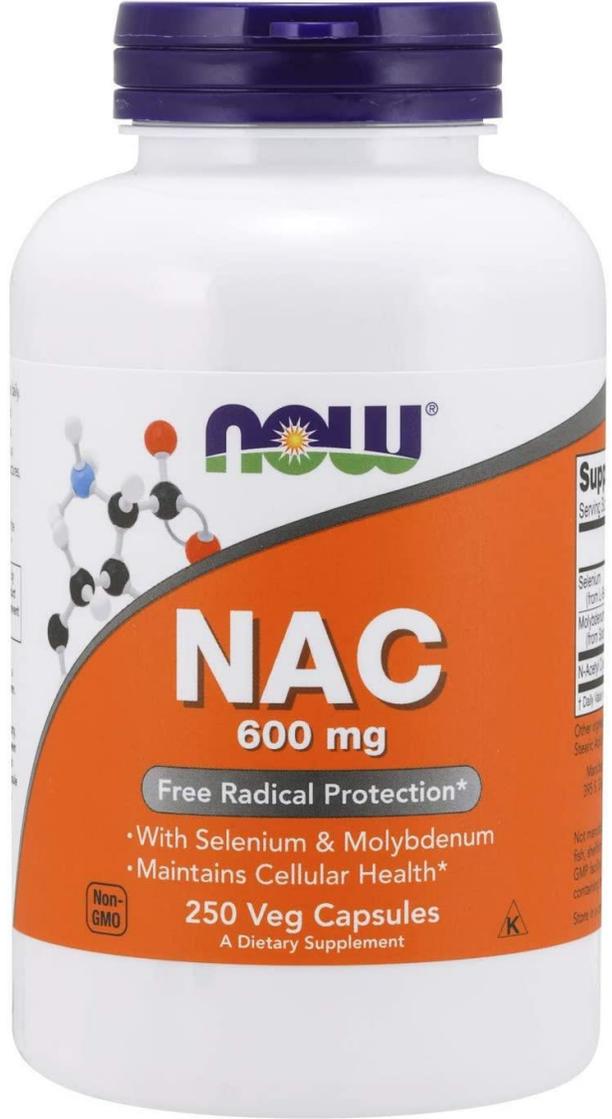




**N-ACETYL CYSTEINE**

# NAC

- **Improved dementia rating scale**
- **Increased executive function**
- **Highest food sources: onions, lentils, oats, sunflower seeds, garlic**



**now**<sup>®</sup>



# NAC

600 mg

Free Radical Protection\*

- With Selenium & Molybdenum
- Maintains Cellular Health\*

Non-GMO

250 Veg Capsules  
A Dietary Supplement



Supp  
Serving S  
Serving S  
Molecular  
N-Acetyl C  
\* Daily Use  
Other ing  
Serving S  
Not resp  
Fish and  
GMP fac  
contamin  
Store in a

**ALCAR**

# ALCAR

- **Increase levels of nerve growth factor**
- **Especially for those with type 2 Alzheimer's**
- **Top food sources: whole wheat bread, asparagus, spinach, chickpeas, avocado, brown rice, and oranges**

**RESVERATROL**

# RESVERATROL

- **Antioxidant**
- **Anti-inflammatory**
- **Top food sources: peanuts, pistachios, red grapes, blueberries, cranberries, bilberries**

**PANTOTHENIC ACID**

# PANTOTHENIC ACID

- **Improves focus and alertness**
- **Top food sources: Shiitake mushrooms, avocado, sunflower seeds, sweet potato, lentils, grapefruit**

One patient allows himself to think about the future **again** when he talks to his grandchildren.



Another said her memory is  
better than it has been in thirty  
years.



One musician's wife said his guitar  
playing has returned.



The daughter of another said her mother, who had been disappearing slowly each time she returned from college, is **once again** part of the family.

