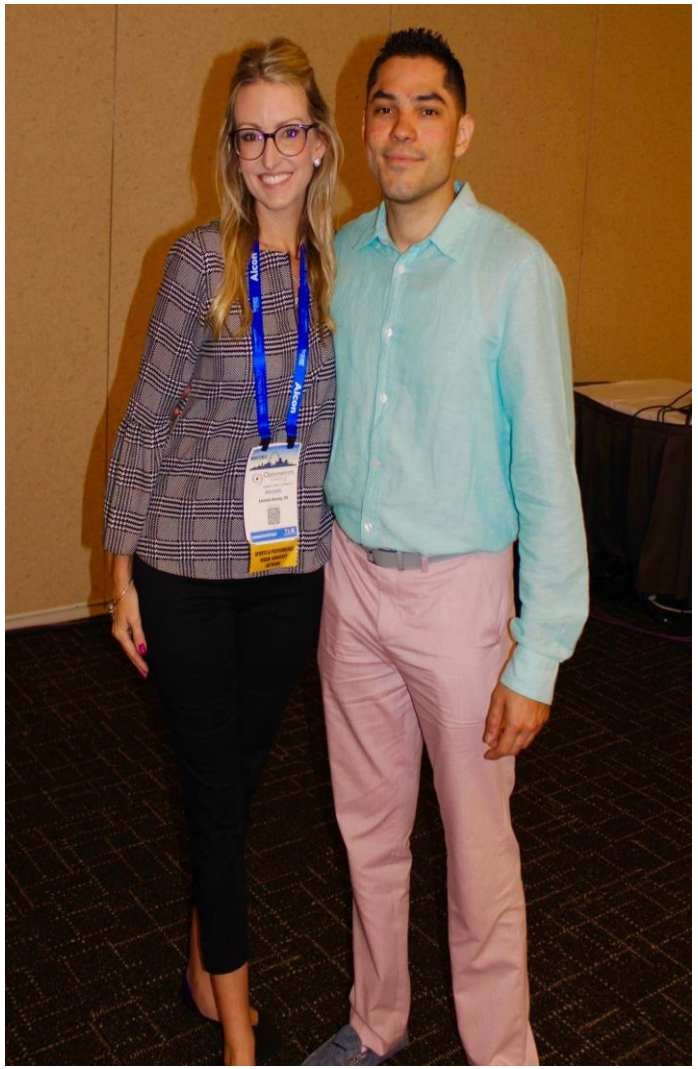
# How To Keep A Brain Healthy: An Oral Game Plan!

Vittorio Mena O.D., M.S.

# Sports Vision Background

- 2013: AOSA National Liaison Sports Vision Section
- 2014-2016: Examined players/coaches/staff NY Giants
- 2017-Present: Director Sports Vision (Optical Academy)
  - Also work with NYC Dept. of Ed and Health
- 2018: Special Olympics Opening Eyes Clinical Director
  - New Jersey, Pennsylvania, Seattle, Orlando (June 2022)
- 2019: NJSOP Young O.D. of the Year
- 2020: NJSOP Board of Directors
- 2021: AOA Sports Performance Vision Section
- Mentors/Colleagues:
  - Dr. Stephen Morris (University of Miami)
  - Dr. Paul Berman (NJ Devils & NJ Nets; Global Senior Advisor)
  - Dr. Fraser Horn (Nike, Dean of Pacific University)
  - Dr. Keith Smithson (Washington Wizards, Nationals, D.C. United)
  - Dr. Fred Edmunds (NY Mets, XTREMESIGHT)
  - Dr. David Kirschen (Boston Red Sox, U.S. Olympic Teams)
  - Dr. Michael Galloway (T.E.I. & Special Olympics)
  - Dr./Lt.Col. Richard Baird (U.S. Airforce)

American Optometric Association
Sports Vision Section



Dr. Amanda Nanasy (Miami Dolphins)

# Financial Disclosures

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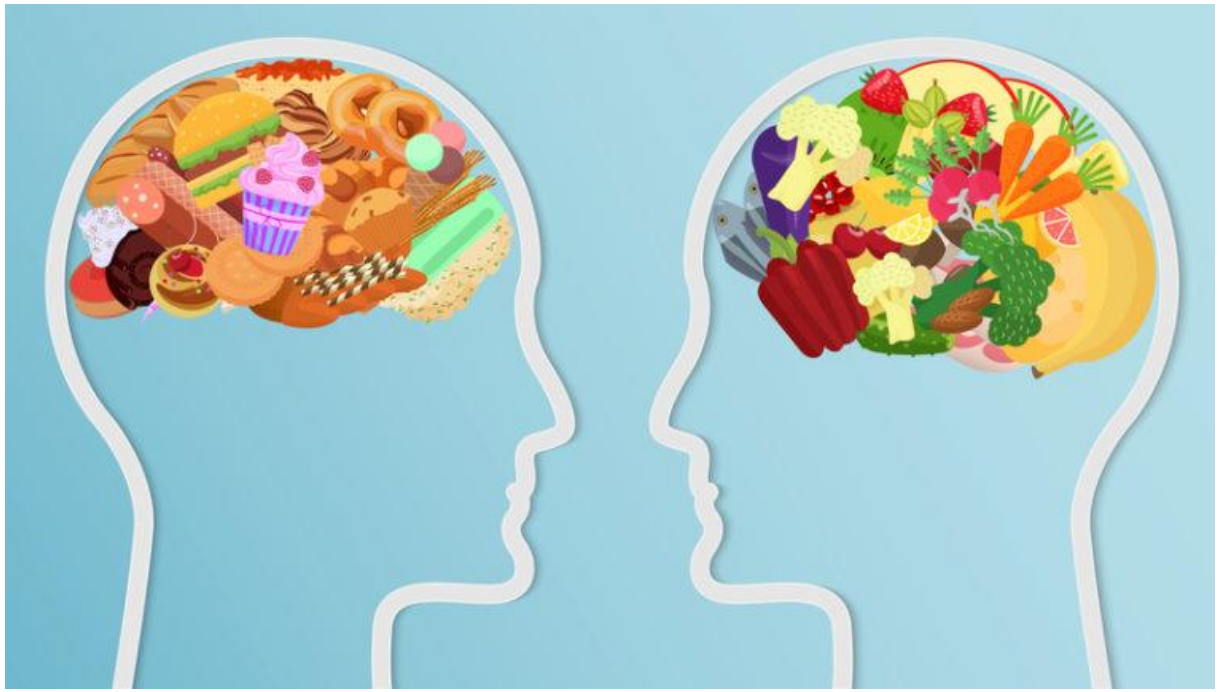
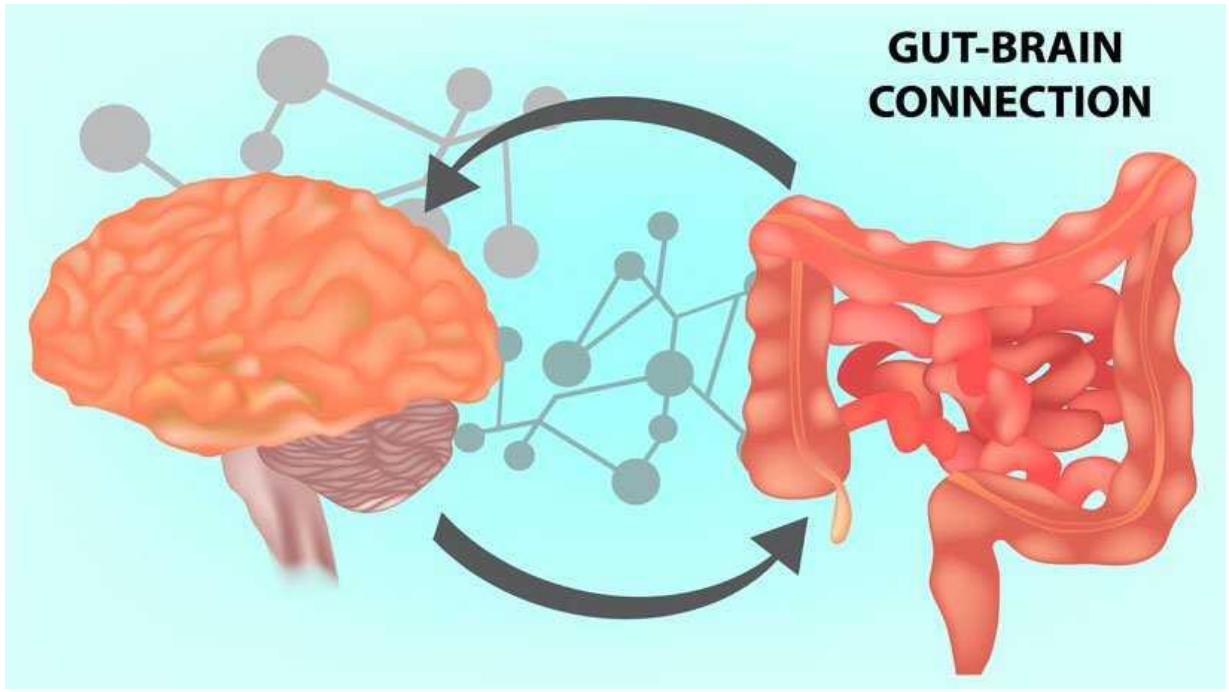
SEE BRILLIANTLY

MacuHealth

VTI | naturalVue®
REDEFINING VISION

# You Are Your Brain






Serotonin & Melatonin = Found in the Brain and Gut

Serotonin = 90% in the gut

Melatonin = 70% in the gut

Banskota, S. et al. Serotonin in the gut: Blessing or a curse June 2018 Biochimie 161

# *Treat Your Body Like A Maserati*

- Maintain A Fuel Tank:
  - Consume adequate calories
- Provide Quality Fuel:
  - Aim for balance
- Fuel and Refuel:
  - What to eat and when
- Do Not Overheat:
  - Hydrate to keep your body cool
- Track Your Gas Mileage:
  - Keep a log of nutrition and training

Your body is precious.
It is your vehicle for awakening.
Treat it with care.

-Buddha

# *True or False?*

Having a healthy diet and taking part in exercise means we will live long and healthy lives…

# Healthy Eating & Exercise = Long Life

- Winston Churchill
  - Prime Minister of England
  - Heavily obese
  - Famous for drinking alcohol daily and always smoking cigars

- Bruce Lee
  - Martial Artist
  - < 5% body fat
  - Famous for 1 finger push-ups

# Healthy Eating & Exercise = Long Life

- Winston Churchill
  - Died age 90

- Bruce Lee
  - Died age 32



*"A good diet does not make an average athlete great, but a poor diet can make a great athlete average."*

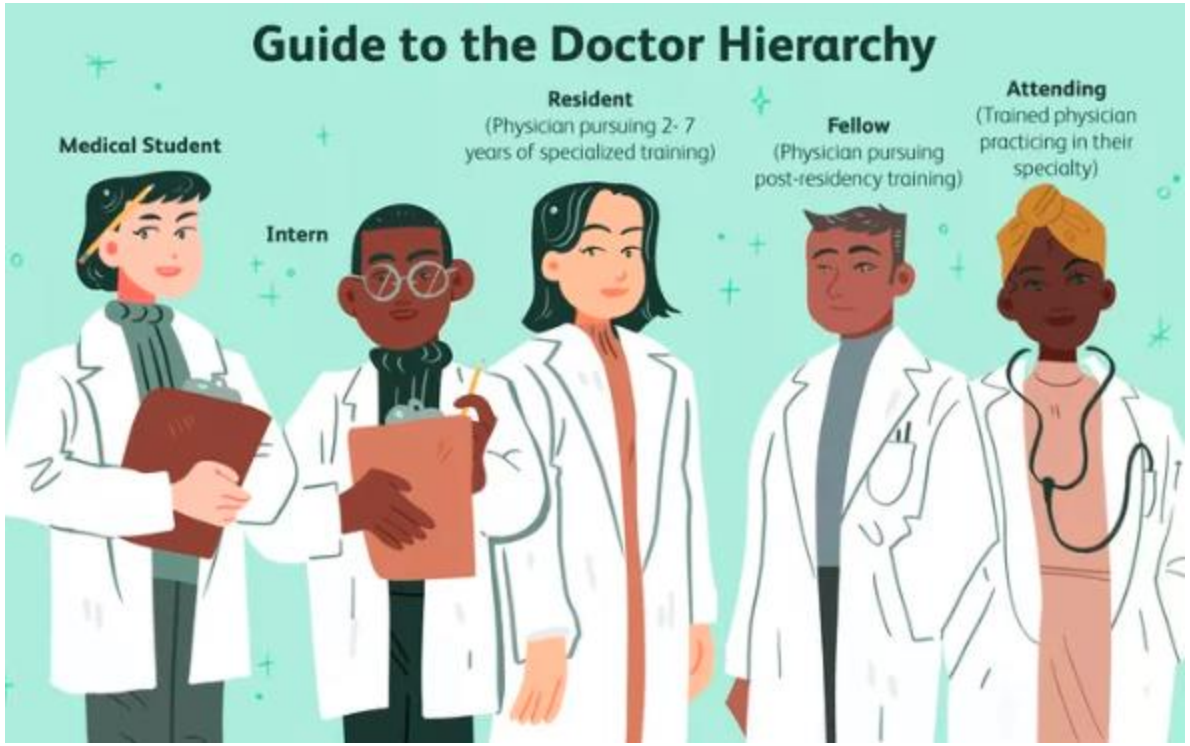
- Dr. David Costill (Exercise Physiologist)

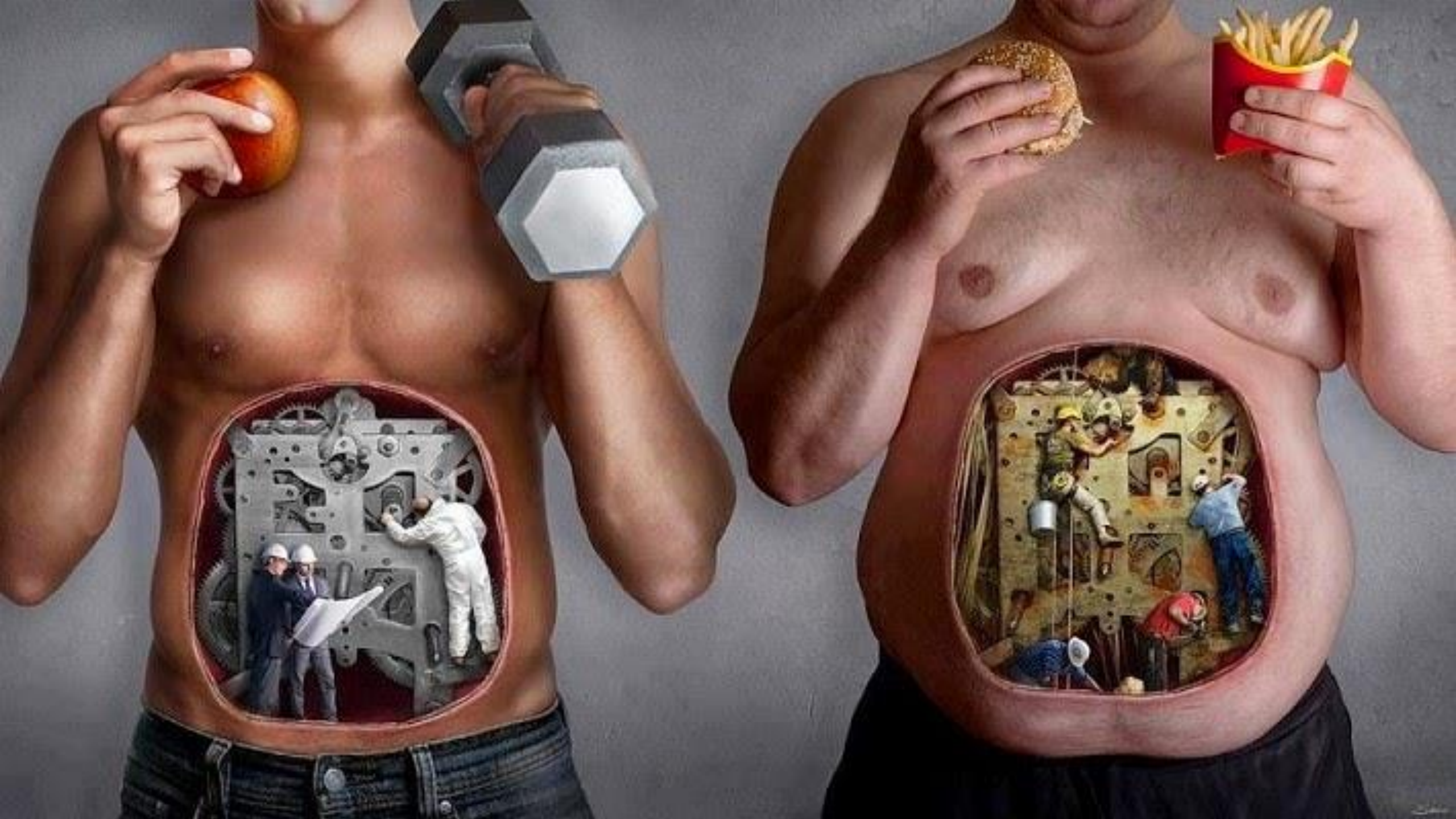
# Healthy Eating & Exercise = Long Life

- U.S. Department of Health:
  - Healthy Diet = Fruits, vegetables, whole grains, low-fat dairy products and lean meats
- National Institute of Diabetes & Digestive & Kidney Disease:
  - Combo of working out and eating healthy foods boost your energy level both mentally and physically
- Why Do Some People Who Break The Rules Get Away With It?!
  - Luck
  - Medical help
  - Genetics

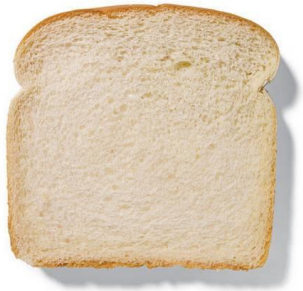
# Nutritional Health vs Medical Health

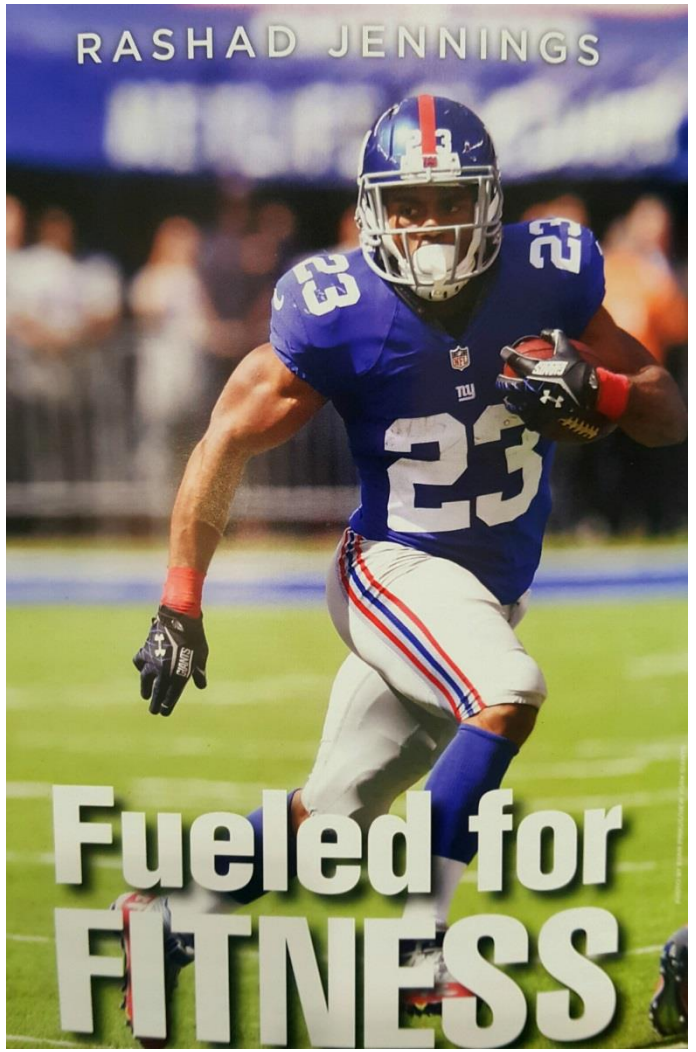
- Conventional Medicine:
  - Considers health to be the absence of injury or disease
- Functional Medicine:
  - Aims to promote health and optimal function by supplementing nutrients to the cells within the brain and body
- Average student in medical school in the U.S. only receives about 24 hours of nutrition training:
  - Less than .01% of their training in the classroom!

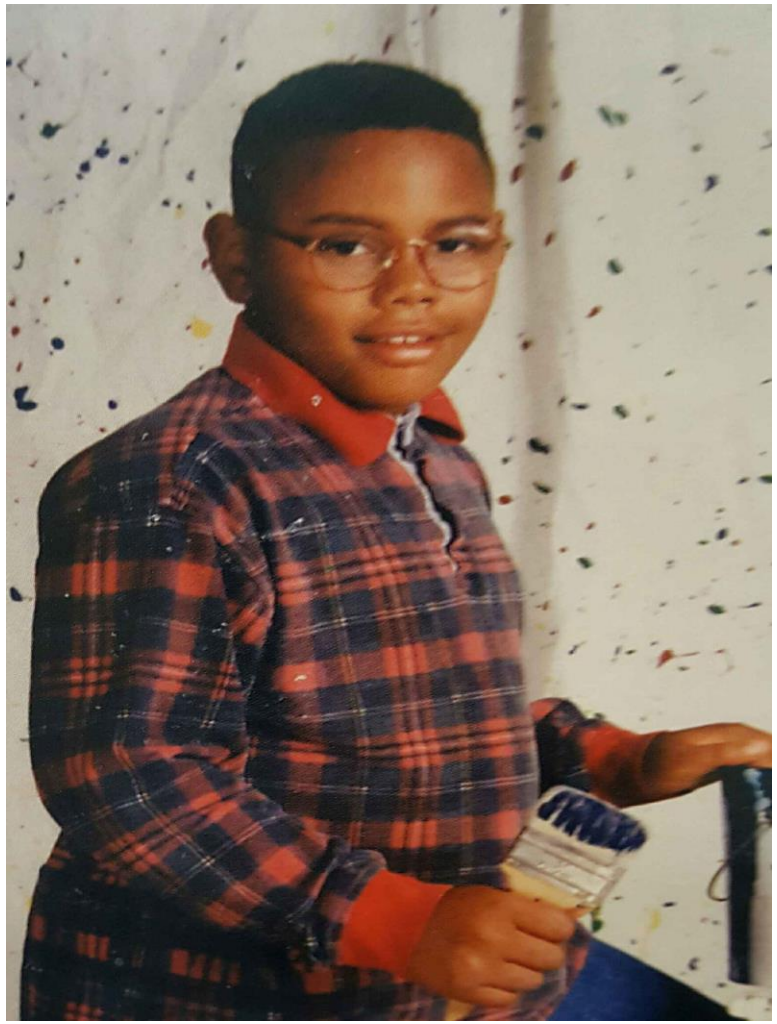


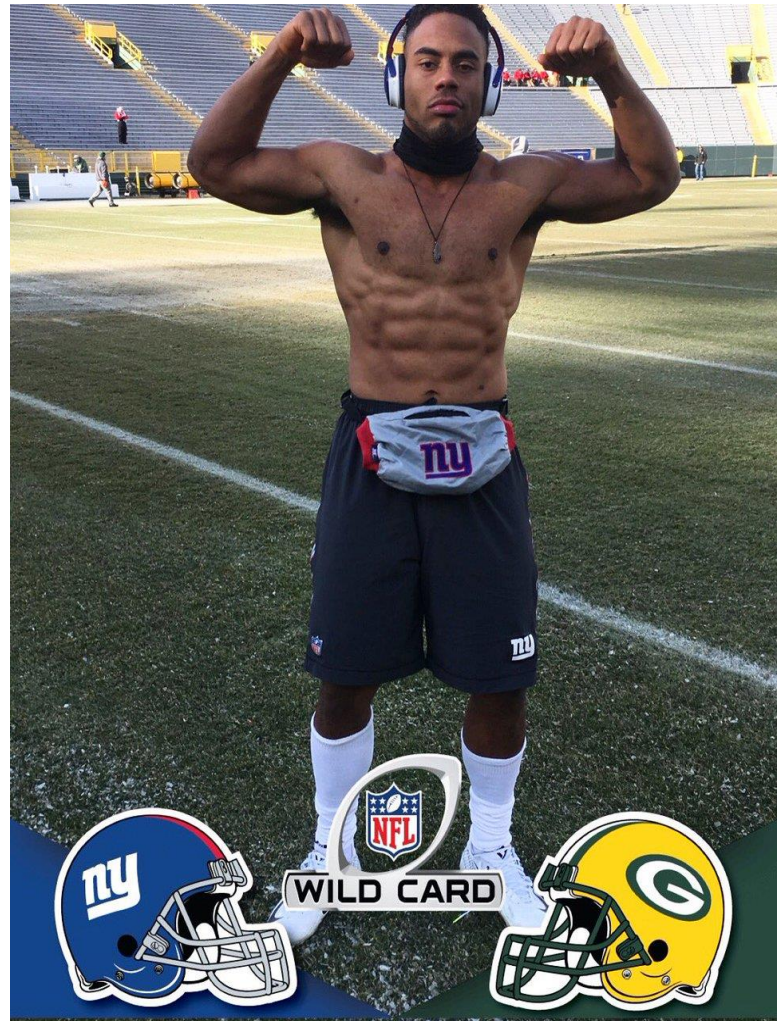


# A Healthy Appetite For Success





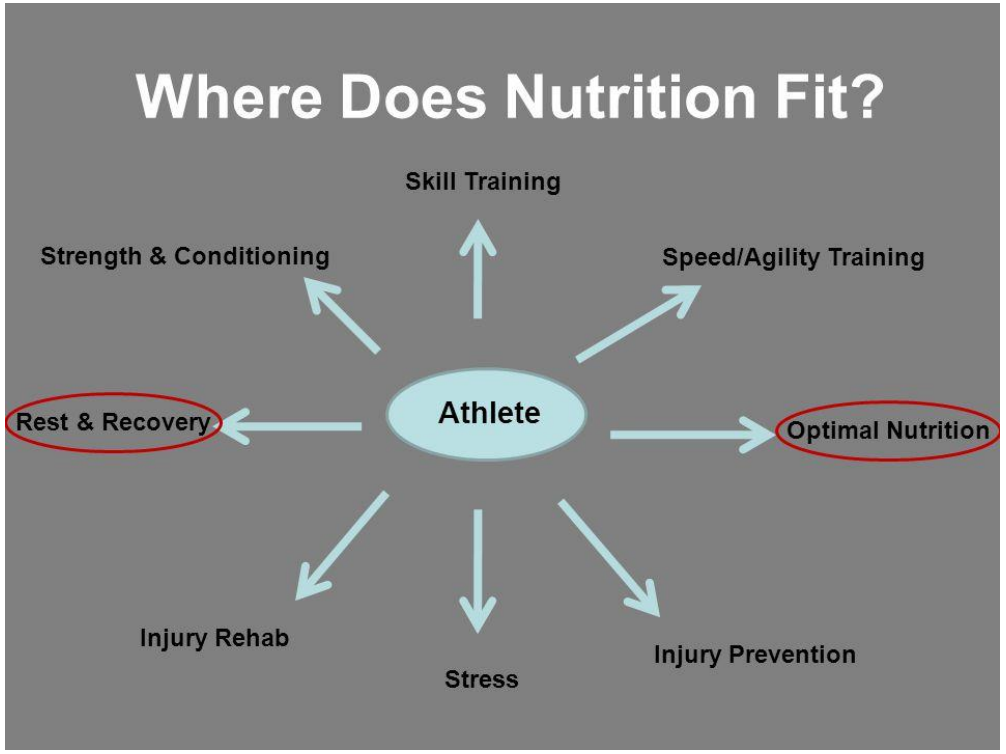


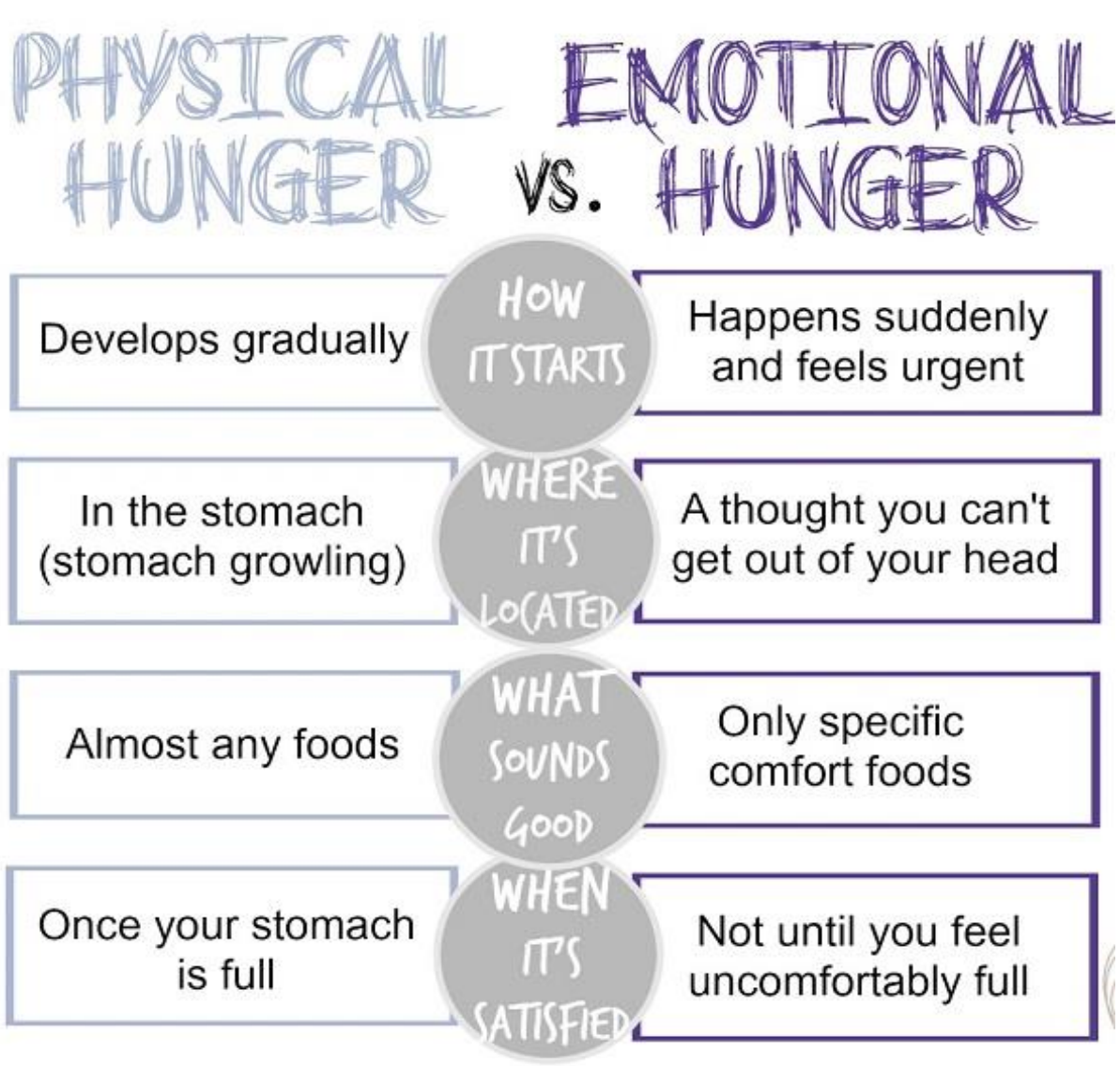



*“Eating is part of training…Often I do things that I am not excited to do, but I know it has an outcome that I’m chasing”*

# Me? I eat pretty healthy…

- 256 HS athletes surveyed on their personal eating habits:
  - They gave themselves a "B"
  - Their actual grade was a "D"
- Change is unlikely if a person sees no need for it






# FOOD CRAVINGS

| YOUR CRAVING | WHAT YOU NEED | WHAT TO EAT INSTEAD |
|---|---|---|
| CHOCOLATE | MAGNESIUM | Nuts, Seeds, Veggies & Fruits |
| SUGAR FOODS | CHROMIUM | Broccoli, grapes, chicken |
| | CARBON | Fresh fruits |
| | PHOSPHORUS | Chicken, beef, fatty fish, eggs, dairy, nuts, veggies, grains |
| | SULPHORE | Cranberries, horseradish, cabbage, cauliflower |
| | TRYPTOPHAN | Raisins, sweet potatoes, spinach |
| BREAD, PASTA & OTHER CARBS | NITROGENE | High protein foods: meat, salmon, nuts, beans, chia seeds |
| OILY FOODS | CALCIUM | Organic milk, green leafy, grass fed, vegetables |
| SALTY FOODS | CHLORIDE | Fatty fish, goat milk |
| | SILICON | Cashews, nuts, seeds |

# Usain Bolt, Sprinter

**Diet Type:** High in carbs and protein


## Breakfast

- Egg sandwich

## Lunch

- Pasta
- Corned beef or fish



## Dinner

- Broccoli
- Yams
- Chicken or other meat
- Jamaican dumplings



## Snacks

- Fruit (mango, pineapple, apples)



**SOURCE:** GQ

TECH INSIDER

# Michael Phelps, Swimmer

**Diet Type:** Tons of calories

## Breakfast

- Fruit
- Coffee
- Large bowl of oatmeal
- Big ham and cheese omelet

## Lunch

- Meatball sub

## Dinner

- Whole grains
- Lean meats
- Veggies

**SOURCE:** Men's Health

TECH INSIDER

"More and more, sleep is being recognized as the most obvious, accessible and natural performance enhancer in the NFL - the kind of secret weapon that players have always dreamed about."

*- Sports Illustrated*

# "SLEEP IS THE MOST POTENT PERFORMANCE-ENHANCING ACTIVITY THAT WE KNOW OF."

*- Jeffrey Kahn, Sports Performance Scientist*

Optimal skill learning in athletes is dependent on quality sleep within the first 24 hours after training because that is when the human brain learns. It's practice, with sleep, that makes perfect.

*- Role of sleep in performance and recovery of athletes: a review article*

## THE EFFECTS OF MORE SLEEP ON ATHLETIC PERFORMANCE

**BASKETBALL PLAYERS:** improved foul shot accuracy by 9%, 3-point shot accuracy by 9.2%, court sprint time by .7 seconds

**SWIMMERS**: improved 15-meter sprint times by .51 seconds (8%), reaction time off starting blocks by .15 seconds (17%). American records broken

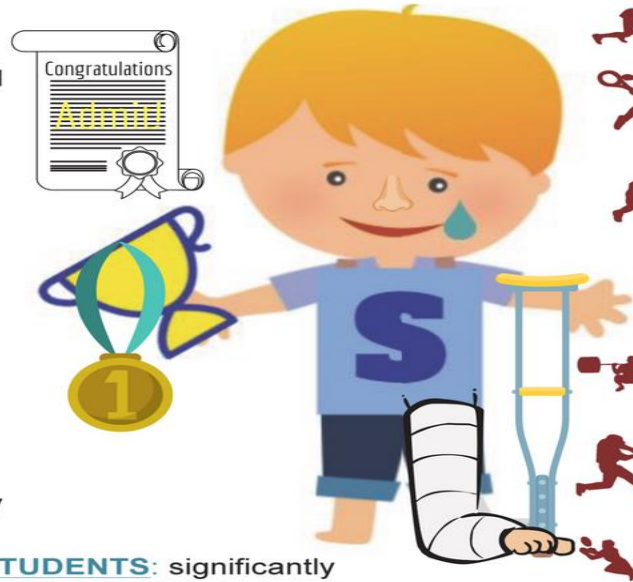
**BASEBALL PLAYERS:** faster reaction times by 122ms (a fastball takes 400ms) and decreased fatigue by 40%

**TENNIS PLAYERS:** improved hitting accuracy by 42% and sprint times by 8%

**FOOTBALL PLAYERS:** improved 40-yard dash and 20-yard shuffle times by .1 seconds,[5] field-goal accuracy by 20%. Fewer mental errors by 50%

After sleep education, 100% of **STUDENT ATHLETES** got more sleep and 89% experienced improved athletic performance

**ALL**: One night of sleep improves motor-learning task speed by 20% and accuracy by 39%




**10TH GRADE STUDENTS**: significantly improved reaction time with 1 day/week later school start time

**4th – 6th GRADE STUDENTS**: significantly improved reaction time and memory tests with 35 more minutes of sleep

sleep for success

A local 501(c)(3) non-profit founded by Westport moms

For more details and study references for this info-graphic, please visit www.sleepforsuccesswestport.com

## THE EFFECTS OF LESS SLEEP ON ATHLETIC PERFORMANCE

**ALL**: student athletes sleeping < 8 hours = ~70% more likely to get injured

**ALL**: Sleep duration = strongest predictor of injury (not practice hours, # sports played, strength training, gender, or coaching style)

**ALL**: Sleeping 6 hours/night lowers reaction time by 18%

**TENNIS PLAYERS**: significantly decreased serving accuracy after one night of less sleep. Caffeine did not change result

**BASKETBALL**: significantly decreased shooting accuracy and fewer points scored, rebounds, steals, and blocks significantly increased # of technical fouls

**TRACK AND FIELD**: significantly decreased reaction times, increased false starts and lapses in attention

**WEIGHT-LIFTERS**: lifted significantly less weight during biceps curl, bench press, leg press, and dead lift

**BASEBALL**: 7 yrs. of data showed visiting team's sleep loss due to travel resulted in home team scoring 1.24 more runs

**YOUNG ADULTS**: ~ 5 hours of sleep/night for 2 nights = a 3X increase in lapses of attention and reaction times

**ADULTS**: 19 hours awake = decrease in reaction time & eye-hand coordination similar to performance when well rested but legally intoxicated

**ALL**: sleeping 4 hours/night for 6 nights = ~ 35% decrease in glucose metabolism, which is similar to patients with type-2 diabetes

"I really can't say it enough. I don't think people really pay enough attention to how important sleep is." - *Michael Phelps*

# Do Omega-3s Improve Sleep?

## 'Higher levels of omega-3 in diet associated with better sleep'

SCIENCE SOCIETY

A randomised placebo-controlled study by the University of Oxford suggests that higher levels of omega-3 DHA, the group of long-chain fatty acids found in algae and seafood, are associated with better sleep.

## Weekly fish consumption linked to better sleep, higher IQ

*Date:* December 21, 2017

*Source:* University of Pennsylvania

*Summary:* Regular fish consumption has been shown to improve cognition. It's also been known to help with sleep. A new study connects all three for the first time. The team found that children who eat fish at least once a week sleep better and have higher IQs by an average of 4 points.

*Share:*

Science: Humans need at least 7 hours of sleep per night to function normally

IN THE JOURNALS

# Children with less sleep experience increased depression, anxiety, decreased cognitive performance

Cheng W, et al. *Mol Psychiatry.* 2020;doi:10.1038/s41380-020-0663-2.
February 11, 2020

ADD TOPIC TO EMAIL ALERTS

Jianfeng Feng

Shorter sleep duration among children was associated with increased risk for depression, anxiety, impulsive behavior and poor cognitive performance, according to study findings published in *Molecular Psychiatry.*

"Sleep disturbances are common among children and adolescents around the world, with approximately 60% of adolescents in the United States receiving less than 8 hours of sleep on school nights," **Jianfeng Feng, PhD,**

# Omega-3 vs Omega-6

Adv Pediatr. Author manuscript; available in PMC 2017 Aug 1.

*Published in final edited form as:*

Adv Pediatr. 2016 Aug; 63(1): 453–471.

Published online 2016 Jun 3. doi: 10.1016/j.yapd.2016.04.011

PMCID: PMC5207030

NIHMSID: NIHMS776753

PMID: 27426911

## Docosahexaenoic Acid and Arachidonic Acid Nutrition in Early Development

Susan E. Carlson, PhD[a,*] and John Colombo, PhD[b,c]

# Which One Are You Picking To Eat?!

SOCK-EYE Salmon

or

KING Salmon

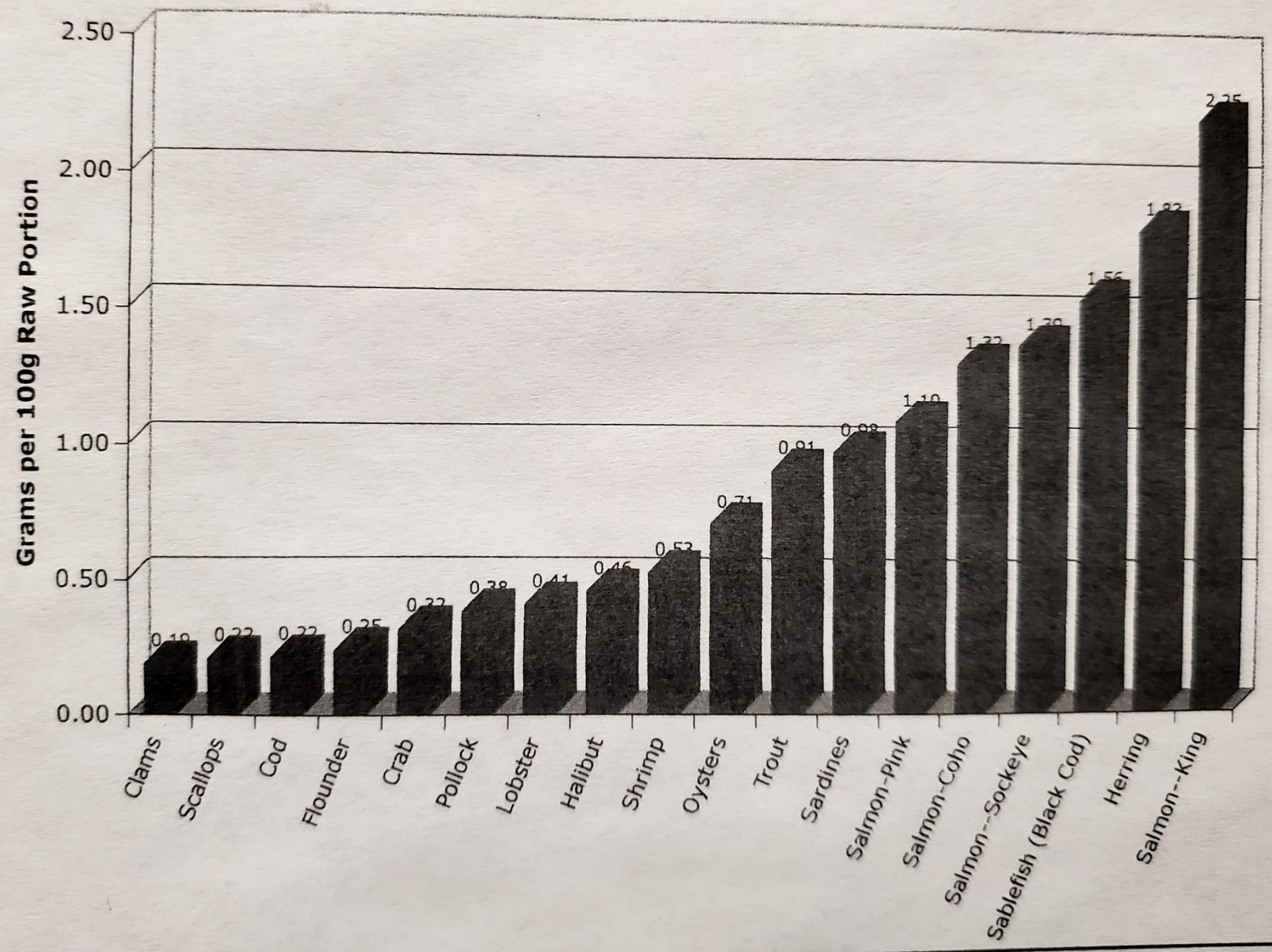

Product of Iceland
Atlantic Salmon
Fillet
Farm Raised, Fresh
$9.99
POUND
Unit Price: $9.9900 PER POUND
29200300000
Non-Synthetic Color Added
RESPONSIBLY FARMED


Product of USA
Sockeye Salmon
Fillet
Wild Caught, Previously Frozen
$15.99
POUND
Unit Price: $15.9900 PER POUND
29203400000
SUSTAINABLE SEAFOOD MSC


Product of Canada
King Salmon
Fillet
Wild Caught, Previously Frozen
$28.99
POUND
Unit Price: $28.9900 PER POUND
29209000000
SUSTAINABLE SEAFOOD MSC
www.msc.org

## Long Chain Omega-3s in Common Seafood

Source: USDA National Nutrient Database for Standard Reference
http://www.nal.usda.gov/fnic/foodcomp/




3.5 oz
Wild Atlantic Salmon
(Cooked):
1.2-2.3 grams DHA
0.35 grams EPA

Food Serving Sizes:
1 ounce = 28 grams

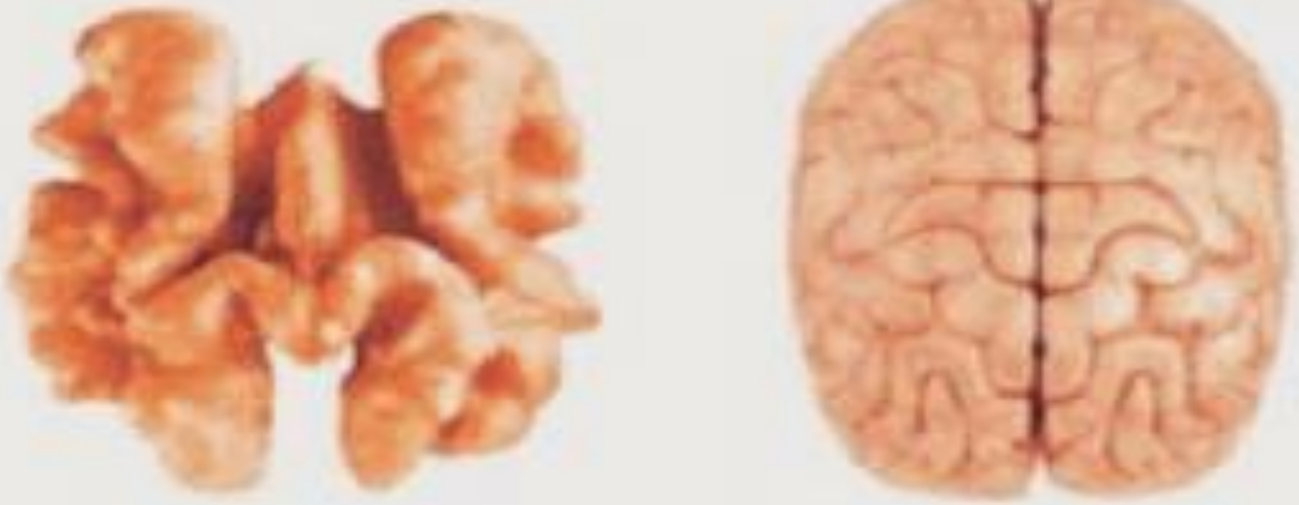
# Macronutrients

- Water:
  - Transport nutrients and waste products in and out of the cells
  - Digestive, absorptive, circulatory, excretory functions
  - Maintenance of proper body temperature
- Carbs: 4 calories/gram
  - Fuel for workouts and recovery after workouts
    - Main source of blood glucose (Muscles & Brain)
  - Plant foods: Fruits, vegetables, grains, legumes
  - Animal foods: Milk
- Proteins: 4 calories/gram
  - Muscle growth and repair
  - Manufactures hormones, Abs, enzymes and tissues
  - Proper pH in the body
- Fats: 9 calories/gram
  - Shock absorber and protective shield (Brain, heart, internal organs)
  - Saturated: Animal/Dairy products (Milk, cheese, veal, beef, lamb)
  - Polyunsaturated: Corn, soybean, sunflower oils, certain fish oils
    - Should not exceed more than 10% of total caloric intake
  - Monounsaturated: Vegetable/nut oils (Oil, peanut, canola)
  - Trans: Add hydrogen to vegetable oil (Hydrogenation)

# Brain Health

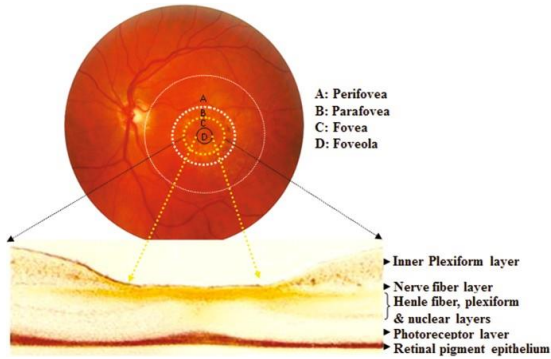
- Brain + Visual System = 2% of your body weight
  - 25% nutritional intake
- Anything that is good for the heart is great for the brain
- Aerobic exercise = “First aid kit” on damaged brain cells
  - Morning = Spikes brain activity and increases retention of new information and better reaction to complex situations
  - Kids = 1 hr a day
  - **Adults = <u>150 min a week!</u>** (30 min/5 days a week)
  - Boosts the hippocampus (Memory/Learning)
    - Improves long term and short term memory
  - Lowers risk of developing Dementia/Alzheimer’s
- Hitting a wall or mentally exhausted?
  - Try doing a few jumping jacks

The shape, wrinkles, and folds of a WALNUT make it look like a tiny BRAIN. And guess what? Walnuts are excellent brain food!



When looked at end-on, a CARROT slice resembles an orange EYE. That makes sense because the vitamin A in carrots supports healthy eyes.

# Macular Pigment

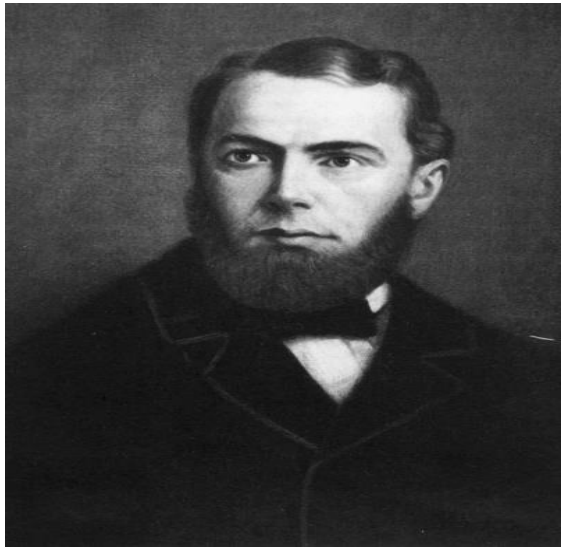


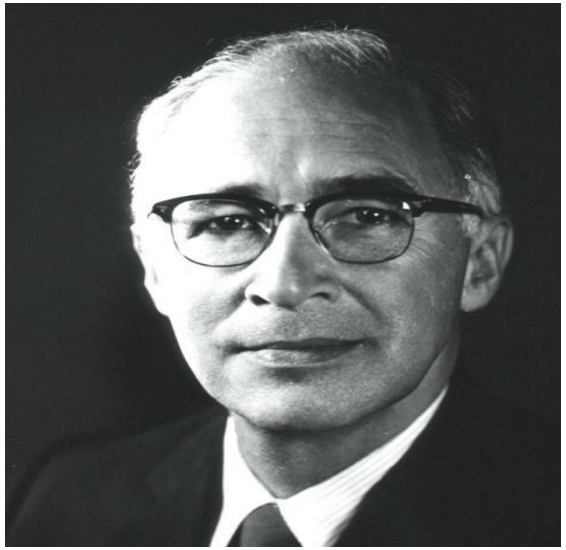

- Macular Pigment (MP) is composed of three dietary carotenoids:
  - Lutein, zeaxanthin, mesozeaxanthin
- MP protects macula from blue light induced oxidative stress and enhances vision
- MP enhances vision:
  - Filters Blue Light (380-500): reduces chromatic aberration, enhances visual acuity and Contrast Sensitivity (CS)[2,3]
  - Reduces Discomfort Glare: reduces photophobia[2-4], improves Photo Stress Recovery (PSR) time[5]
- Xanthophylls play a protective role against retinal oxidation
- **The majority of the population gets only 1-2 mg lutein from diet alone[1]**
- Studies suggest that healthy adults need:
  - Lutein = 10 mg
  - Zeaxanthin = 2mg


1. Ranard, K., et al. Dietary guidance for lutein: Consideration for intake recommendations is scientifically important. NCBI. European Journal of Nutrition. 2017.
2. Stringham JM, Fuld K, Wenzel AJ. Spatial properties of photophobia. *Invest Ophthalmol Vis Sci*. 2004.
3. Wenzel AJ, Fuld K, Stringham JM, Curran Celentano J. Macular pigment optical density and photophobia light threshold. *Vis Res.* 2006.
4. Stringham JM, Hammond BR. The glare hypothesis of macular pigment function. *Optom Vis Sci*. 2007.
5. Stringham JM, Garcia PV, Smith PA, et al. Macular pigment and visual performance in glare: benefits for photostress recovery, disability glare, and visual discomfort. *Invest Ophthalmol Vis Sci*. 2011.

# History Lesson

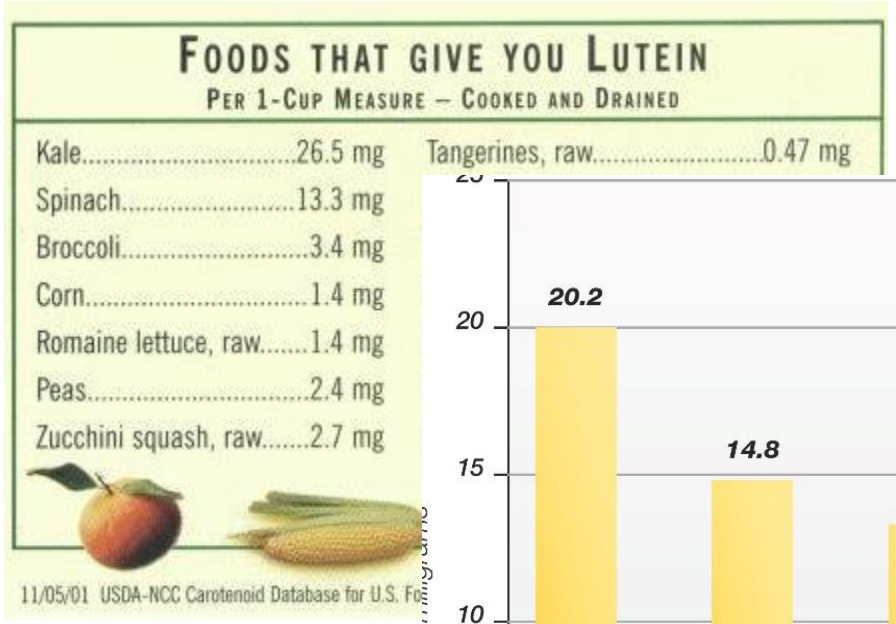
- 1866: Max Schultze
  - “Therefore, under an otherwise equal organization, a retina without a yellow spot would see more blue light than one with such a spot”
- 1945: George Wald
  - Won the Nobel Prize 1967
  - Discovered Vitamin A was a component of the retina
- 1985:
  - Macular pigment consisted of lutein and zeaxanthin
- 1988: L&Z Confirmed (Handelman et al)
- 1995:
  - International ARM Epidemiological Study Group
    - Classification & Grading system for AMD



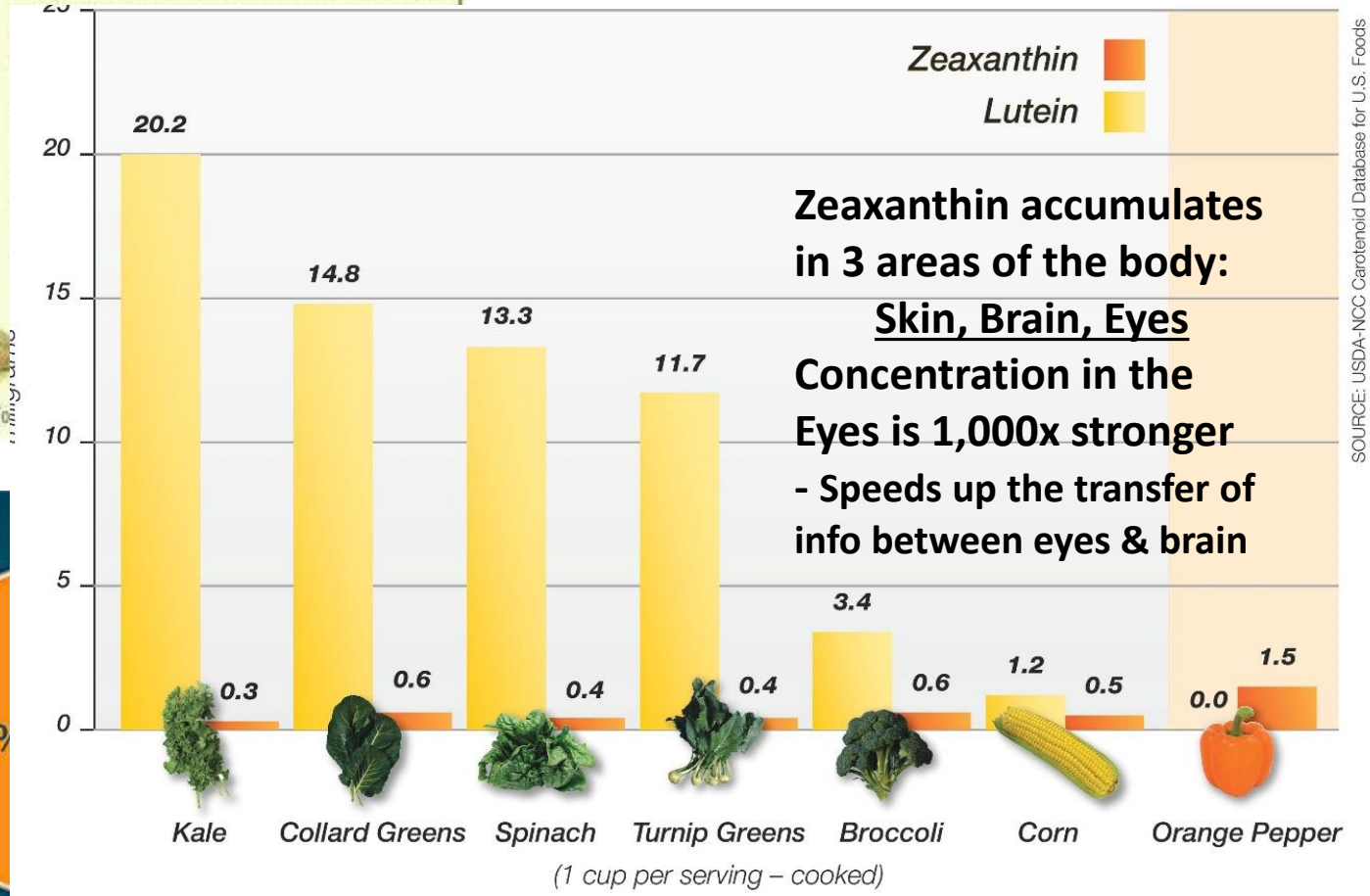


Bone RA, Landrum JT, Tarsis SL (1985) Preliminary identification of the human macular pigment. Vis Res **25**:1531–1535.

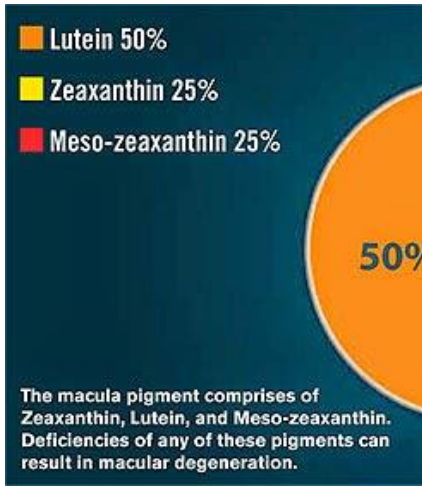
# Lutein & Zeaxanthin (Home Run Hitters)

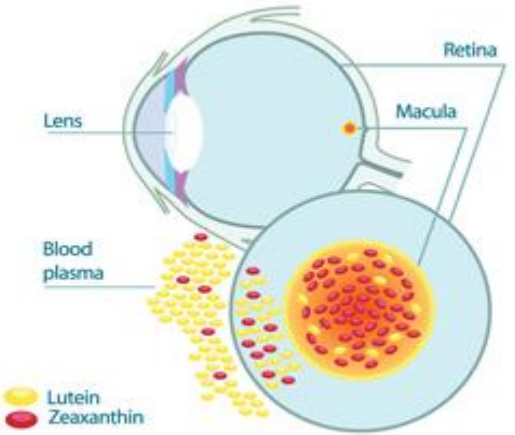


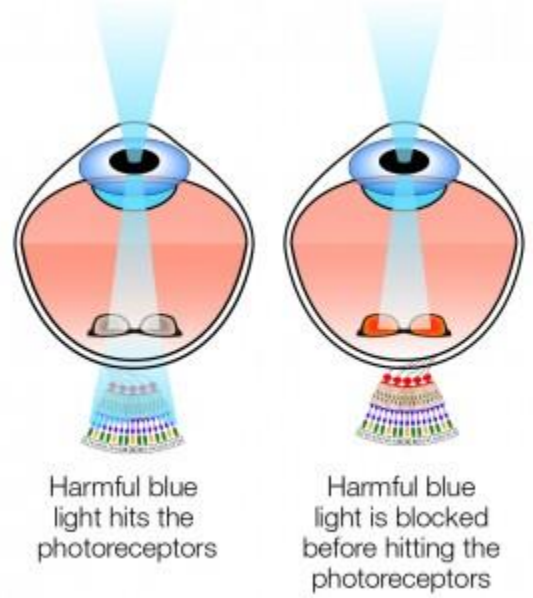

- 2:1 Z to L Ratio




**Zeaxanthin accumulates in 3 areas of the body:**
**<u>Skin, Brain, Eyes</u>**
**Concentration in the Eyes is 1,000x stronger**
**- Speeds up the transfer of info between eyes & brain**



# Sports Illustrated


SCORECARD

Batters need to pick up the spin of the seams on a ball going 90 mph.

TRAINING WITH

## See World

Baseball players have set their sights on a nutrient that improves vision

**ASK PIRATES** second baseman Neil Walker *(hitting)* for the most important qualities of his game, and he won't talk about catching or hitting. "You can't do those things without good vision," he says.

Ocular workouts and vision drills on computers have become ubiquitous around MLB, and now players are also eating their way to improved sight. In a 2014 study published in *The Archives of Biochemistry and Biophysics*, researchers from the University of Georgia found evidence linking visual processing speed and reaction time with the daily intake of zeaxanthin, a nutrient found in many deeply pigmented vegetables and paprika. A year later all 30 major league teams have started experimenting with the nutrient.

Walker tried zeaxanthin in spring 2014 after experiencing dry eyes and struggling with glare. "After taking it every day, I felt like my contrast was better, and I wasn't squinting as much," says Walker, 29. "It was like internal sunglasses, especially during day games."

Zeaxanthin works in the macula, the small, cone-packed area of the retina that provides high-acuity vision, says optometrist Graham Erickson. Naturally occurring phytonutrients (the pigments that give food its colors) are distributed throughout the body when digested, but zeaxanthin concentrates in the macula. "Because the eye can process light faster," says Erickson, "there can be improvements to reaction time and coincidence anticipation, like timing the arrival of the ball from a pitch."

As more players start to use zeaxanthin, nutritionists learn more about optimizing dosages and timing, but for now, Walker is happy with the results. "I get that [the improvement] is something that's hard to measure," he says. "But when you're trying to track baseballs at the plate or in the field for a living, that's kind of your own little test." —*Jamie Lisanti*

### EDGE

Most teams use zeaxanthin in supplement form—Reys assistant athletic trainer Paul Harker keeps it next to the multivitamins and fish oil—which is available at health and nutrition stores. The nutrient is also found naturally in several foods that can be incorporated into anyone's diet for similar effects. —J.L.

***Greens*** Swap iceberg and romaine for dark leafy greens like kale, spinach, collard greens and dandelion greens.

***Reds*** Zeaxanthin is derived from the chili pepper that produces paprika, but red bell or spicy cayenne peppers are also good sources, as are goji berries.

***Yellows*** Egg yolks have a high concentration of zeaxanthin and lutein, another naturally occurring nutrient that improves vision.

For more athlete training profiles and tips, go to *SI.com/edge*

AMDF® American Macular Degeneration Foundation — Saving sight through research and education

About Macular Degeneration | **Treatment** | Service Providers | Research & Cases | Available

Store

# Lutein for Preventing Macular Degeneration

## Lutein May Decrease Your Risk of Macular Degeneration

*by George Torrey, Ph.D.*

- Dr. Johanna Seddon & associates at Harvard University found that 6 mg per day of lutein led to 43% lower risk of AMD[1]
- Recommended Dosage:
  - 6mg to 30mg daily
  - Smokers = 10 mg daily
  - Post-menopausal woman = 10 mg daily

HARVARD UNIVERSITY

Johanna M. Seddon et al, Journal of American Medical Association. 1994.

Ophthalmology. Author manuscript; available in PMC 2013 Nov 1.
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Ophthalmology. 2012 Nov; 119(11): 2282–2289.
Published online 2012 Jul 26. doi: 10.1016/j.ophtha.2012.05.027

PMCID: PMC3485447
NIHMSID: NIHMS379632
PMID: 22840421



# The Age-Related Eye Disease Study 2 (AREDS2): Study Design and Baseline Characteristics (AREDS2 Report Number 1)

Emily Y. Chew, MD, Chair,[1] Traci Clemons, PhD,[2] John Paul SanGiovanni, ScD,[1] Ronald Danis, MD,[3] Amitha Domalpally, MD,[3] Wendy McBee, MS,[2] Robert Sperduto, MD,[2] Frederick L. Ferris, MD,[1] and the AREDS2 Research Group

| Formulations | Vitamin C (mg) | Vitamin E (IU) | Beta Carotene (mg) | Zinc Oxide (mg) | Cupric Oxide (mg) |
|---|---|---|---|---|---|
| 1 | 500 | 400 | 15 | 80 | 2 |
| 2 | 500 | 400 | **0** | 80 | 2 |
| 3 | 500 | 400 | 15 | **25** | 2 |
| 4 | 500 | 400 | **0** | **25** | 2 |

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Ophthalmology. 2007 Feb;114(2):253-62. doi: 10.1016/j.ophtha.2006.10.040.

# Fifteen-year cumulative incidence of age-related macular degeneration: the Beaver Dam Eye Study

Ronald Klein [1], Barbara E K Klein, Michael D Knudtson, Stacy M Meuer, Maria Swift, Ronald E Gangnon

Affiliations + expand

PMID: 17270675 DOI: 10.1016/j.ophtha.2006.10.040

## Abstract

**Purpose:** To describe the 15-year cumulative incidence of signs of early and late age-related macular degeneration (AMD).

**Results:**

- 14.3% Early AMD
- 3.1% Late AMD
- > 75yo at Baseline:
  - Larger drusen 24.1% / 10.6%
  - Soft indistinct drusen 18.7% / 6.5%
  - Retinal pigmentary abnormalities 20.2% / 3.7%
  - Exudative 4.4% / 0.4%
  - GA 3.2% / 0%

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Randomized Controlled Trial > Eye (Lond). 2015 Jul;29(7):902-12. doi: 10.1038/eye.2015.64. Epub 2015 May 15.

# Sustained supplementation and monitored response with differing carotenoid formulations in early age-related macular degeneration

K O Akuffo [1], J M Nolan [1], A N Howard [2], R Moran [1], J Stack [1], R Klein [3], B E Klein [3], S M Meuer [3], S Sabour-Pickett [1], D I Thurnham [4], S Beatty [1]

Affiliations + expand

PMID: 25976647 PMCID: PMC4506345 DOI: 10.1038/eye.2015.64

**Group 1:**
- L: 20mg
- Z: .86mg

**Group 2:**
- 10:10:2
- MZ:L:Z

**Group 3:**
- 17:3:2
- MZ:L:Z

**Results:**
- Between 24-36 months significant increases in MP in groups 2 and 3 and no increase in group 1
- Contrast sensitivity significantly improved in group 2 beyond 24 months but not in group 1 or 3
- AMD: None progressed to advanced AMD over the 3 year study with group 2

# CREST STUDY



Clinical Trial > Invest Ophthalmol Vis Sci. 2016 Jun 1;57(7):3429-39. doi: 10.1167/iovs.16-19520.

## Enrichment of Macular Pigment Enhances Contrast Sensitivity in Subjects Free of Retinal Disease: Central Retinal Enrichment Supplementation Trials – Report 1

John M Nolan [1], Rebecca Power [1], Jim Stringham [2], Jessica Dennison [1], Jim Stack [1], David Kelly [1], Rachel Moran [1], Kwadwo O Akuffo [1], Laura Corcoran [1], Stephen Beatty [1]

Affiliations + expand

PMID: 27367585 DOI: 10.1167/iovs.16-19520

Retina | September 2011

# Macular Pigment and Visual Performance in Glare: Benefits for Photostress Recovery, Disability Glare, and Visual Discomfort

James M. Stringham; Paul V. Garcia; Peter A. Smith; Leon N. McLin; Brian K. Foutch

+ Author Affiliations & Notes

Investigative Ophthalmology & Visual Science September 2011, Vol.52, 7406-7415.
doi:https://doi.org/10.1167/iovs.10-6699

U.S. AIR FORCE

711TH HUMAN PERFORMANCE WING

Randomized Controlled Trial > Physiol Behav. 2019 Nov 1;211:112650.
doi: 10.1016/j.physbeh.2019.112650. Epub 2019 Aug 16.

# Effects of macular xanthophyll supplementation on brain-derived neurotrophic factor, pro-inflammatory cytokines, and cognitive performance

Nicole T Stringham [1], Philip V Holmes [2], James M Stringham [3]

Affiliations + expand

PMID: 31425700 DOI: 10.1016/j.physbeh.2019.112650

Meso-zeaxanthin maintains the highest antioxidant capacity

Springer Link

Original Paper | Open Access | Published: 07 October 2015

# Assessment of lutein, zeaxanthin and *meso*-zeaxanthin concentrations in dietary supplements by chiral high-performance liquid chromatography

Alfonso Prado-Cabrero, Stephen Beatty, Alan Howard, Jim Stack, Philipp Bettin & John M. Nolan

*European Food Research and Technology* **242**, 599–608 (2016) | Cite this article

**4099** Accesses | **13** Citations | **20** Altmetric | Metrics

## Abstract

We investigated the concordance between actual and declared content of the three macular carotenoids in commercially available supplements aimed at eye health. Three batches of nine products were tested for content of lutein (L), zeaxanthin (Z) and *meso*-zeaxanthin (MZ) by chiral HPLC–DAD. In every product tested, actual L concentration was close to target, but Z concentration varied greatly (47–248 % of declared concentration), and the L:Z ratio within

| Supplement name, manufacturer, carotenoid supplier | Batch number | Months expiry | Carotenoids (mg/capsule) | | | % Achieved (95 % confidence) |
|---|---|---|---|---|---|---|
| | | | Declared | | Measured | |
| **Preservision AREDS2** [®b] | 2710E0566 | 16 | **L** | 5 | 6.05 ± 0.27 | 121 (117–125) |
| Bausch + Lomb® [L] | 2936E0566 | 16 | **Z** | 1 | 1.63 ± 0.11 | 163 (155–172) |
| Floraglo® Lutein | 2939E0566A | 16 | **MZ** | * | nd | – |
| **VitaluxPlus** [®a] | E02010 | 13 | **L** | 10 | 11.12 ± 0.52 | 111 (107–115) |
| Alcon® | E05507 | 16 | **Z** | 2 | 1.03 ± 0.07 | 52 (49–54) |
| Floraglo® Lutein | E03745 | 15 | **MZ** | * | 0.10 ± 0.01 | – |
| **Nutrof ® omega** [a] | V067 | 10 | **L** | 10 | 9.54 ± 0.67 | 95 (90–101) |
| Spectrum Thea® | V070 | 12 | **Z** | 2 | 1.30 ± 0.27 | 47 (44–50) |
| Floraglo® Lutein | V063 | 8 | **MZ** | * | 0.94 ± 0.08 | – |
| **Ultra Lutein** [®a,c] | 1266679 | 17 | **L** | 20 | 20.78 ± 0.73 | 104 (101–107) |
| Nature's Plus® | 1263243 | 14 | **Z** | 0.86 | 2.13 ± 0.09 | 248 (240–256) |
| Floraglo® | 1268878 | 17 | **MZ** | * | 0.18 ± 0.03 | – |
| **Eyepromise Restore** [®b] | C1401047 | 28 | **L** | 4 | 4.83 ± 0.14 | 121 (118–123) |
| Zeavision® | H13059 | 22 | **Z** | 8 | 1.28 ± 0.07[#] | 16 (15–17) |
| Floraglo® Lutein, Zeagold® | B14045 | 28 | **MZ** | * | 0.04 ± 0.01 | – |
| **CentroVision ® L forte** [a] | 5054 | 15 | **L** | 14 | 13.91 ± 0.45 | 99 (97–102) |
| OmniVision GmbH® | 4581 | 10 | **Z** | 1.04 | 1.68 ± 0.08 | 161 (156–167) |
| Floraglo® Lutein | 8180 | 10 | **MZ** | * | 0.11 ± 0.01 | – |
| **MacuHealth with LMZ3** [® d] | 110614 | 29 | **L** | 10 | 10.89 ± 1.34 | 109 (99–119) |
| Macuhealth LLC® | 160314 | 26 | **Z** | 2 | 2.19 ± 0.49 | 109 (90–128) |
| IOSA® | 330913 | 20 | **MZ** | 10 | 12.15 ± 2.14 | 122 (105–138) |
| **MacuShield** [® d] | 116215 | 11 | **L** | 10 | 12.11 ± 0.91 | 121 (114–128) |
| Macuvision Europe® | 118860 | 21 | **Z** | 2 | 2.51 ± 0.25 | 126 (116–135) |
| IOSA® | 120480 | 26 | **MZ** | 10 | 12.70 ± 0.74 | 127 (121–133) |
| **Ocuvite ® L Plus** [a] | D09592 | 10 | **L** | 5 | 5.53 ± 0.26 | 111 (107–115) |
| Bausch + Lomb® | D09588 | 10 | **Z** | 1 | 0.60 ± 0.03 | 60 (57–62) |
| Unknown | D09591 | 10 | **MZ** | * | 0.79 ± 0.03 | – |

# National Sanitation Foundation (NSF) Certified

- Free of banned substances (More than 180)
- NSF Certification Recognized by:
  - NFL
  - MLB
  - NHL
  - PGA & LPGA
  - CCES (Canadian Centre for Ethics in Sport)

PGA®
The Professional Golfers' Association

**NSF certification gives athletes the piece of mind to know that their supplement is safe & effective**

# COAST STUDY



> Antioxidants (Basel). 2020 Aug 18;9(8):767. doi: 10.3390/antiox9080767.

## The Impact of Formulation on Lutein, Zeaxanthin, and *meso*-Zeaxanthin Bioavailability: A Randomised Double-Blind Placebo-Controlled Study

Marina Green-Gomez [1], Alfonso Prado-Cabrero [1], Rachel Moran [1], Tommy Power [1], Laura G Gómez-Mascaraque [2], Jim Stack [1], John M Nolan [1]

Affiliations + expand

PMID: 32824736 PMCID: PMC7463514 DOI: 10.3390/antiox9080767

Free PMC article

- Results:
  - L increased by 200% in the AREDS 2 study and by 304% in the CREST AMD study
  - Group 4 of carotenoids exhibited the largest response of absorption of Z and Mz

- **Group 1:**
  - L (10mg) +MZ (10mg) +Z (2mg) provided in 1 capsule
- **Group 2:**
  - L (10mg) +MZ (10mg) +Z (2mg) provided in 2 capsules
- **Group 3:**
  - L (10mg) +MZ (10mg) +Z (2mg) provided in DHA (430mg) and EPA (90mg) in 2 capsules
- **Group 4:**
  - Ld (10 mg) +MZd (10mg) +Zd (2mg) provided in a micromicelle formulation in 1 capsule
- **Group 5:**
  - Placebo (Sunflower oil)

> Invest Ophthalmol Vis Sci. 2015 Apr;56(4):2459-68. doi: 10.1167/iovs.14-15716.

# Macular Pigment and Visual Performance in Low-Light Conditions

James M Stringham [1], Paul V Garcia [2], Peter A Smith [2], Paul L Hiers [2], Leon N McLin [3], Thomas K Kuyk [2], Brian K Foutch [4]

Affiliations + expand

PMID: 25783608 DOI: 10.1167/iovs.14-15716

Randomized Controlled Trial > J Alzheimers Dis. 2015;44(4):1157-69. doi: 10.3233/JAD-142265.

# The impact of supplemental macular carotenoids in Alzheimer's disease: a randomized clinical trial

John M Nolan [1], Ekaterina Loskutova [1], Alan Howard [2], Riona Mulcahy [3], Rachel Moran [1], Jim Stack [1], Maggie Bolger [3], Robert F Coen [4], Jessica Dennison [1], Kwadwo Owusu Akuffo [1], Niamh Owens [1], Rebecca Power [1], David Thurnham [5], Stephen Beatty [1]

Affiliations + expand

PMID: 25408222 DOI: 10.3233/JAD-142265

Randomized Controlled Trial > J Alzheimers Dis. 2018;61(3):947-961. doi: 10.3233/JAD-170713.

# Supplemental Retinal Carotenoids Enhance Memory in Healthy Individuals with Low Levels of Macular Pigment in A Randomized, Double-Blind, Placebo-Controlled Clinical Trial

Rebecca Power [1], Robert F Coen [2], Stephen Beatty [1], Riona Mulcahy [3], Rachel Moran [1], Jim Stack [1], Alan N Howard [4], John M Nolan [1]

Affiliations + expand

PMID: 29332050 DOI: 10.3233/JAD-170713

Randomized Controlled Trial > Nutr Neurosci. 2018 May;21(4):286-296.
doi: 10.1080/1028415X.2017.1286445. Epub 2017 Feb 15.

# Supplementation with macular carotenoids reduces psychological stress, serum cortisol, and sub-optimal symptoms of physical and emotional health in young adults

Nicole Tressa Stringham [1] [2], Philip V Holmes [1] [2], James M Stringham [2]

Affiliations + expand

PMID: 28198205 DOI: 10.1080/1028415X.2017.1286445

foods

MDPI

Foods. 2017 Jul; 6(7): 47.
Published online 2017 Jun 29. doi: 10.3390/foods6070047

PMCID: PMC5532554
PMID: 28661438

# Macular Carotenoid Supplementation Improves Visual Performance, Sleep Quality, and Adverse Physical Symptoms in Those with High Screen Time Exposure

James M. Stringham,[1,*] Nicole T. Stringham,[2] and Kevin J. O'Brien[3]


- Doses of 20mg/d for up to 6 months were not associated with any side effects
- Even doses of 30mg/d for 5 months or 40mg/d over 2 months were not associated with any side effects

# Macular Pigment Optical Density



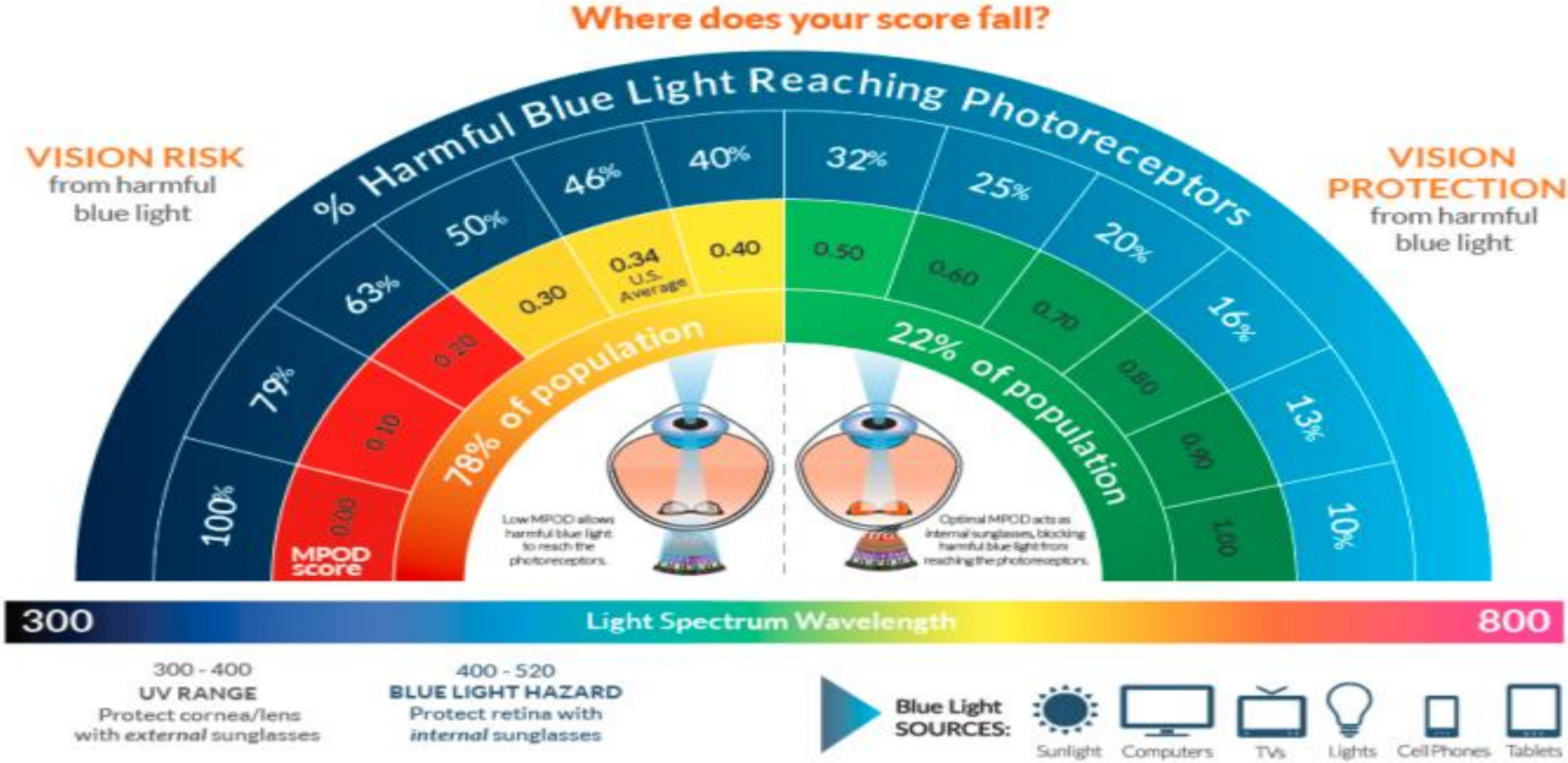
Vision Res. Author manuscript; available in PMC 2011 Mar 31.
*Published in final edited form as:*
Vision Res. 2010 Mar 31; 50(7): 716–728.
Published online 2009 Oct 23. doi: 10.1016/j.visres.2009.10.014

PMCID: PMC2840187
NIHMSID: NIHMS154671
PMID: 19854211



## The Value of Measurement of Macular Carotenoid Pigment Optical Densities and Distributions in Age-Related Macular Degeneration and Other Retinal Disorders

Paul S. Bernstein,[1] François C. Delori,[2] Stuart Richer,[3] Frederik J. M. van Kuijk,[4] and Adam J. Wenzel[5]




** Ciulla, Ophthalmology 2001, 108: 780-787 Hammond, Recent Research Dev. Nutr. 2002 (5)

Contents lists available at SciVerse ScienceDirect

Archives of Biochemistry and Biophysics

journal homepage: www.elsevier.com/locate/yabbi

Review

# Resonance Raman spectroscopic evaluation of skin carotenoids as a biomarker of carotenoid status for human studies

Susan T. Mayne [a,*], Brenda Cartmel [a], Stephanie Scarmo [a,b], Lisa Jahns [c], Igor V. Ermakov [d], Werner Gellermann [d]

[a] Yale School of Public Health and Yale Cancer Center, 60 College St., P.O. Box 208034, New Haven, CT 06520, USA
[b] Center for Science in the Public Interest, 1220 L Street, N.W., Suite 300, Washington, DC 20005, USA
[c] USDA/ARS Grand Forks Human Nutrition Research Center, 2420 2nd Avenue North, Grand Forks, ND 58203, USA
[d] Department of Physics and Astronomy, University of Utah, Salt Lake City, UT 84112, USA

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Resonance Raman spectroscopy
Beta-carotene
Biomarker

ABSTRACT

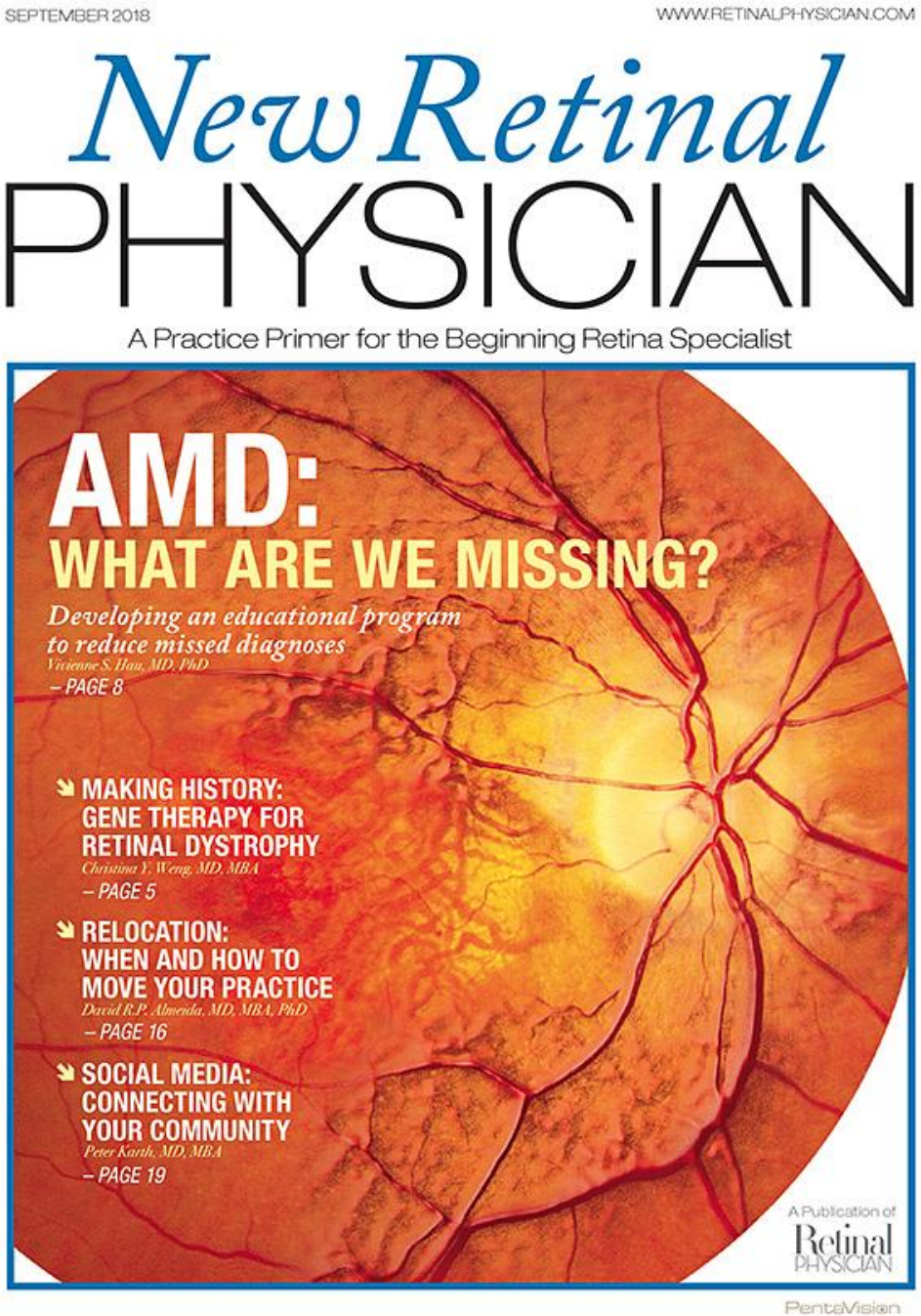
Resonance Raman spectroscopy (RRS) is a non-invasive method that has been developed to assess carotenoid status in human tissues including human skin *in vivo*. Skin carotenoid status has been suggested as a promising biomarker for human studies. This manuscript describes research done relevant to the development of this biomarker, including its reproducibility, validity, feasibility for use in field settings, and factors that affect the biomarker such as diet, smoking, and adiposity. Recent studies have evaluated the response of the biomarker to controlled carotenoid interventions, both supplement-based and dietary [e.g., provision of a high-carotenoid fruit and vegetable (F/V)-enriched diet], demonstrating consistent response to intervention. The totality of evidence supports the use of skin carotenoid status as an objective biomarker of F/V intake, although in the cross-sectional setting, diet explains only some of the variation in this biomarker. However, this limitation is also a strength in that skin carotenoids may effectively serve as an integrated biomarker of health, with higher status reflecting greater F/V intake, lack of smoking, and lack of adiposity. Thus, this biomarker holds promise as both a health biomarker and an objective indicator of F/V intake, supporting its further development and utilization for medical and public health purposes.

# BioPhotonic Scanner

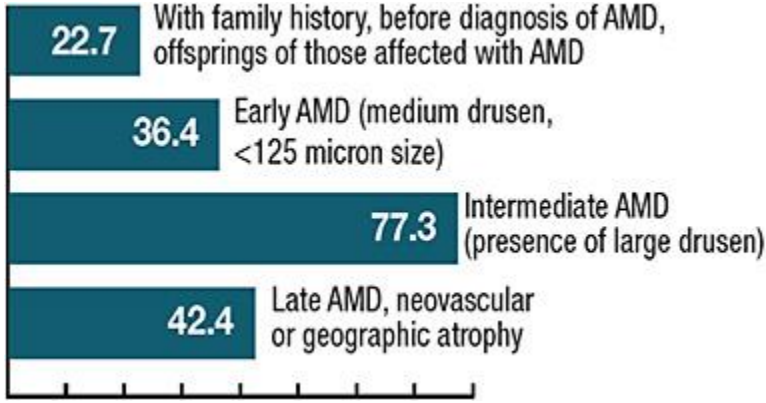

## FACTORS **TYPICALLY** ASSOCIATED WITH SCANNER SCORES

| | | | |
|---|---|---|---|
| DIETARY HABITS | **LOW** INTAKE OF FRUITS/VEGETABLES | **MODERATE** INTAKE OF FRUITS/VEGETABLES | **ABOVE AVERAGE** INTAKE OF FRUITS/VEGETABLES |
| SUPPLEMENT INTAKE | **IRREGULAR** OR NO SUPPLEMENTATION | **REGULAR** SUPPLEMENTATION | **DEDICATED** SUPPLEMENTATION |
| LIFESTYLE CHOICES | **HIGH** STRESS<br>**HIGH** SUN, POLLUTION, OR SMOKE EXPOSURE<br>**FREQUENT** AIR TRAVEL | **MODERATE** STRESS<br>**MODERATE** SUN, POLLUTION, OR SMOKE EXPOSURE<br>**OCCASIONAL** AIR TRAVEL | **LOW/MANAGED** STRESS<br>**OCCASIONAL** SUN, POLLUTION, OR SMOKE EXPOSURE<br>**INFREQUENT** AIR TRAVEL |
| BODY COMPOSITION | **HIGH** BMI<br>**LOW** CAROTENOID ABSORPTION INTO TISSUE | **NORMAL** OR HIGH BMI<br>**AVERAGE** CAROTENOID ABSORPTION INTO TISSUE | **NORMAL** BMI<br>**ABOVE AVERAGE** CAROTENOID ABSORPTION INTO TISSUE |

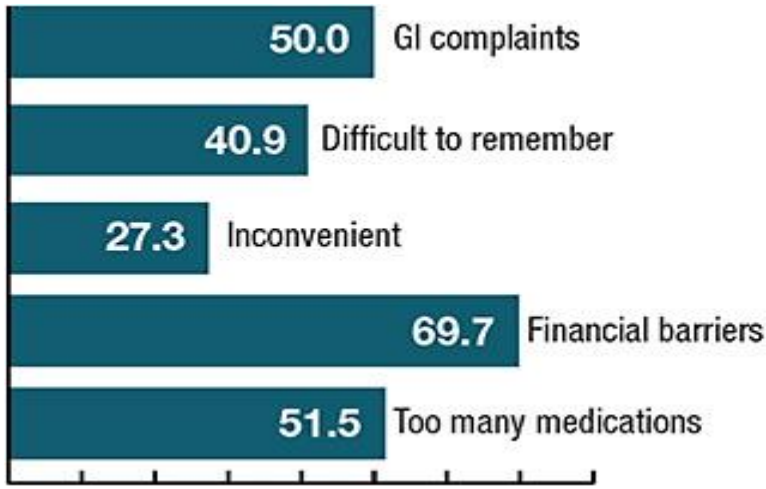

# Impaired Dark Adaptation: The Earliest Biomarker of AMD




1. **At what point in the disease progression do you suggest the patient take a supplement?**

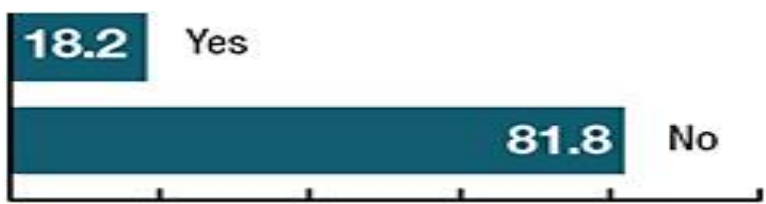



2. **What reasons do patients give for noncompliance?**




3. **Do you believe it is ethical for health care providers to sell supplements in their office?**


4. **Do you sell supplements in your office?**




# Micronutrients

**Vitamins**

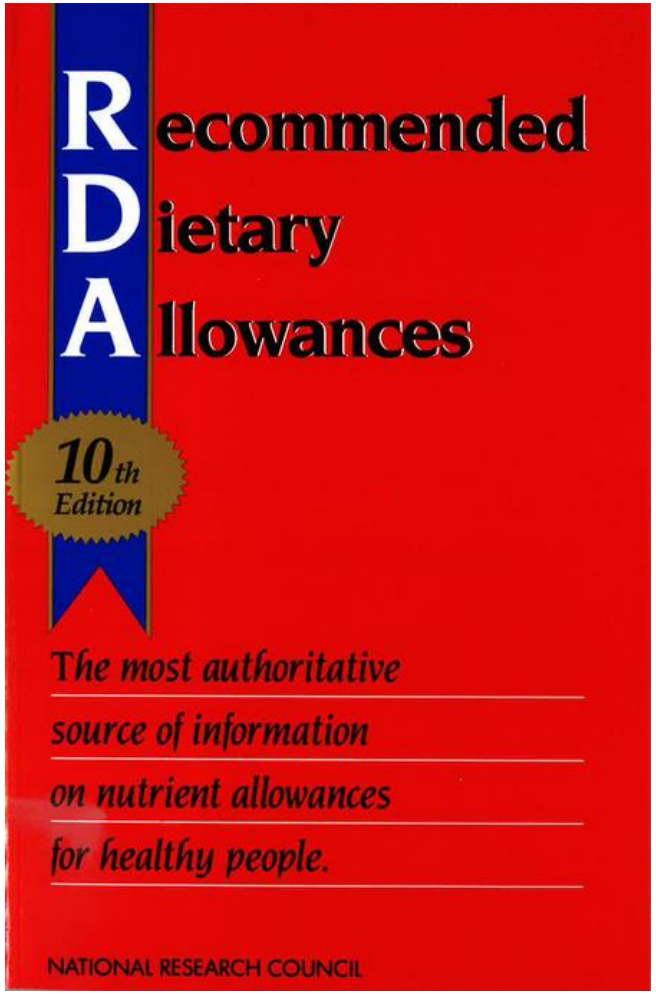
- Vitamin A & Beta-Carotene
- Vitamin B complex
- Vitamin C
- Vitamin D
- Vitamin E
- Vitamin K
- Vitamin H
- Vitamin P
- CoQ10

**Minerals**

- **Calcium**
- Chromium
- Copper
- **Iron**
- Magnesium
- Manganese
- Selenium
- Sodium
- **Zinc**

# Recommended Vitamin & Mineral Intake Levels

- Recommended Daily Allowance (RDA)
  - American Academy of Ophthalmology:
    - Vit A = 900 mcg
    - Vit B Complex = 550mg
    - Vit C = 90 mg
    - Vit D = 15 mcg
    - Vit E = 15 mg
    - Lutein = 10 mg
    - Zeaxanthin = 2 mg
    - Zinc = 11 mg
    - Copper = 900 mcg
- Adequate Intake (AI)
- Healthy Diet:
  - 2,000 calories a day
  - 8 glasses of water a day
  - Macronutrients:
    - **50-60%** (1,000-1,200 calories) from carbs
    - **30%** (600 calories) from fat
    - **10-20%** (200-400 calories) from proteins
    - **7%** Saturated fat (200 calories)




# Vitamin A

CLINICAL REPORT: PDF ONLY

## Clinical Report

### Correlation of Serum Vitamins and Chalazion

Cheng, Haixia MD; Lv, Xuehua MM; Yao, Jiaqi MD; Chen, Zhijun MD

Author Information

Optometry and Vision Science: February 23, 2022 - Volume - Issue -
doi: 10.1097/OPX.0000000000001887

BUY PAP Metrics

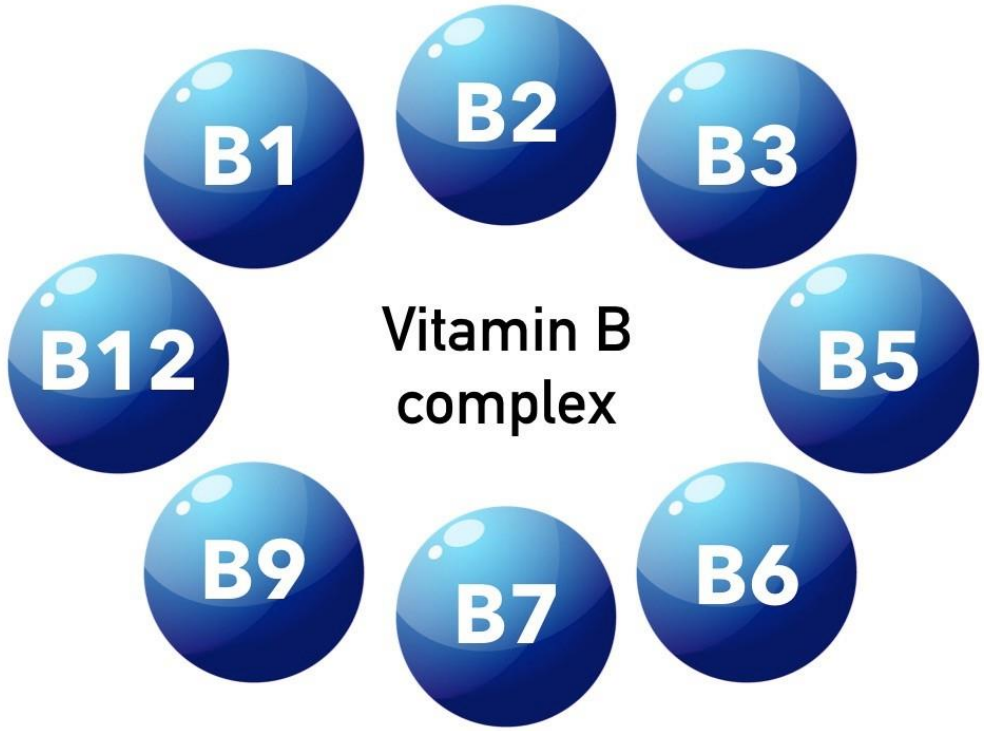
**Abstract**

**Significance**

We demonstrate the clinical correlation between the vitamin A level with chalazion in East Chinese children. Vitamin A deficiency is likely to be a potential cause of childhood chalazion.

- Animals = Retinol
- Plants = Beta-carotene (Carotenoids)
- 90%: stored in the liver
- 10%: Fat tissues, lungs, kidneys, retina
- Diabetics have difficult time converting beta-carotene to Vitamin A
- Benefits = Enhances immunity, bones/teeth, heal GI ulcers, protect cancer formation, slows cataracts
- Food = Only found in animal-derived foods (Liver, egg yolks, dairy products, carrots, kale, spinach)
- Deficiency = Night blindness, chalazion, dry eyes/skin/hair, poor growth, acne, colds
- Eyes: Take 2,500 IU Daily (Good for all eye conditions and supports the retina)
- RDA:
  - Infants & Children = 500 IU (150 mcg/300mcg)
  - 4-12yo = 1,000 IU (300mcg/600mcg)
  - Women = 2,300 IU (690mcg/1380mcg)
  - Men = 3,000 IU (900mcg/1800mcg)
  - No more than 50,000 IU per day (15,000mcg/30.000mcg)

1 IU = 0.3 mcg Retinol / 0.6 mcg Beta-carotene





**Eyes: 75 mg Daily**


# Thiamine ($B_1$)


- Vulnerable to heat, air and water in cooking
- Enhances circulation, assists in formation of blood, and produces HCL (Digestion)
- Found in: Brown rice, egg yolks, fish, legumes, pork, whole grains, nuts
- Cognitive and brain function
- Deficiency: Optic neuritis and impairs CNS
- RDA:
  - 1.1 – 1.4 mg per day
  - During pregnancy = 1.4 mg per day
  - No known toxic side effects


# Riboflavin ($B_2$)

- Stable in the presence of heat, oxidation, acid but disintegrates in presence of light and UV
- Cell respiration, red blood cell formation, Ab production/growth
- Food = Mushrooms, spinach, almonds, lamb
- Eyes = Bloodshot eyes, itching, burning, cataracts, light sensitivity
  - Take 75mg daily (Good for nerves, muscles and fatigue)
- Deficiency = Most common
- RDA:
  - Adult Females = 1.2mg
    - Pregnancy/Lactation = 1.5-1.7mg
  - Adult Males = 1.6mg
  - No known toxic side effects

# Niacin ($B_3$)

- Resistant to heat, light, air, acids, alkalis
- Improve circulation, reduce blood cholesterol levels, nervous system
- Tryptophan converts into niacin by the body
- Leans meats, poultry, fish, peanuts
- RDA:
  - 6.6mg for every 1,000 calories
  - No toxic side effect
  - Too much = Cystoid macular edema

MEPTIC Publications & Middle East Cancer Institute
International Virtual Ophthalmic Research Center
Medical Hypothesis, Discovery & Innovation Ophthalmology Journal

Med Hypothesis Discov Innov Ophthalmol. 2015 Summer; 4(2): 64–71.
PMCID: PMC4458328
PMID: 26060832

Ocular Effects of Niacin: A Review of the Literature

Daniela Domanico,[1] Francesca Verboschi,[1] Simona Altimari,[2] Luigi Zompatori,[2] and Enzo Maria Vingolo[1]

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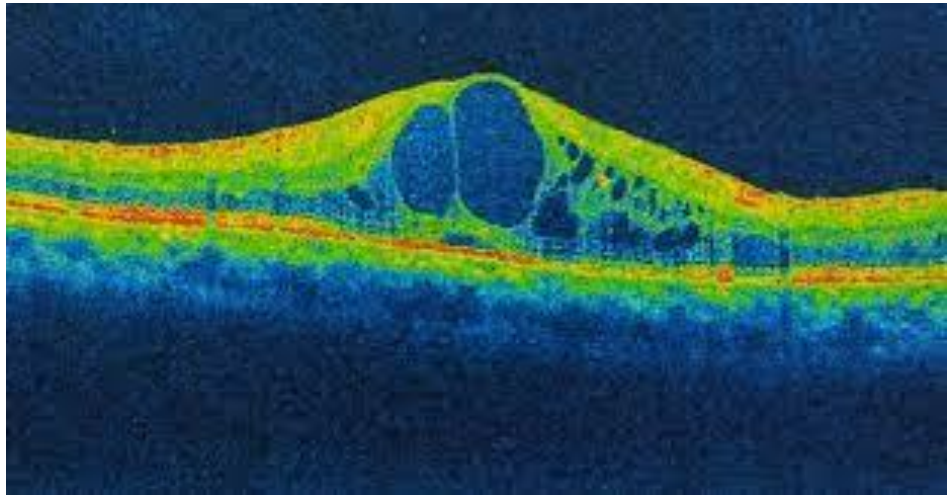
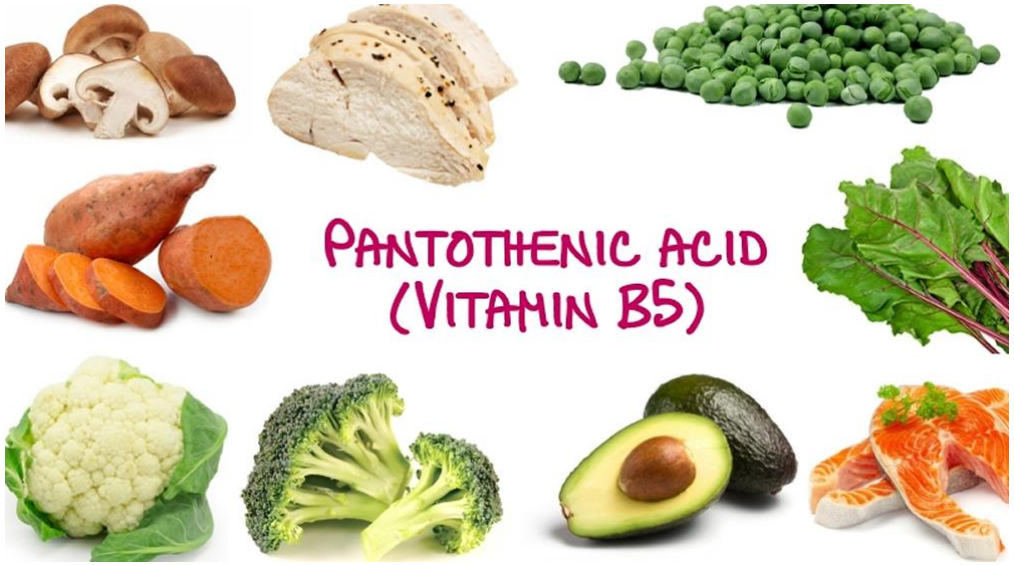


# Pantothenic Acid ($B_5$)

- Synthesis of RBC's and metabolism of steroids
- Meat, poultry, free range eggs, nuts, molasses, oats, barley, cereal
- Deficiency = Adrenal gland function
- RDA:
  - Infants (<6mo) 1.7mg per day
  - Infants (7-12mo) 1.8mg per day
  - Child (1-3yo) 2mg per day
  - Child (4-8 yo) 3mg per day
  - Child (9-13yo) 4mg per day
  - 14 and older = 5mg per day
  - Pregnant/Lactation = 6-7mg per day



# Pyridoxine ($B_6$)

- Needed for the proper absorption of $B_{12}$
- Production of HCL and magnesium
- Food = Salmon, tuna, sweet potato, whole grains, bananas
- Eyes = Central Serous
  - Take 50-200 mg daily (Reduces fluid retention)
- RDA:
  - Child = 0.6 – 1.2mg for every 100g of protein they consume a day
  - Adult = 2 mg for every 100g of protein they consume a day
  - Need for this doubles during pregnancy and lactation

# Biotin ($B_7$)

- Assists enzymes to break down fats, carbs and proteins in food
- Regulates signals sent by cells and activity of genes
- Food = Eggs, salmon, avocadoes, nuts, seeds, beef liver, sweet potato
- Deficiency = Loss of hair and nails or skin problems
- RDA:
  - None


› Neuroreport. 2002 Mar 4;13(3):297-9. doi: 10.1097/00001756-200203040-00010.

**Biotin decreases retinal apoptosis and induces eye malformations in the early chick embryo**

Ana I Valenciano [1], Raquel Mayordomo, Enrique J de La Rosa, Finn Hallböök

Affiliations + expand

PMID: 11930126 DOI: 10.1097/00001756-200203040-00010

# Folic Acid ($B_9$)

- Helps to form DNA & RNA
- Helps in protein metabolism and healthy RBC's
- Rapid growth = Crucial during pregnancy and fetal development
- Food = Dark green leafy vegetables, liver, seafood, eggs, beans, fresh fruits
- Increased Risk = Alcoholics, pregnant, celiac disease, IBD
- RDA:
  - Men & Women = 400 mcg
  - Pregnant & Lactating = 600 mcg

# Cyanocobalamin ($B_{12}$)

- Necessary for normal metabolism of nerve tissue
- Also helps iron function better in the body
- First cobalt containing substance
- The only vitamin that contains essential mineral elements
- Found only in animal protein:
  - Liver best source of $B_{12}$
  - So vegetarians are low in $B_{12}$
- Affects 10-15% adults > 60 yo in the U.S.
  - Megaloblastic anemia
  - Hyperhomocysteinemia (Eyes = Increased risk of dry AMD progressing to wet AMD)
  - Big risk factor for dementia and depression[1]
- RDA:
  - Infants: 3 micrograms (mcg) daily
  - Growing children: 1-2 mcg
  - Adults: 3 micrograms
  - Pregnant: 4 mcg
  - No incident of toxicity have been reported


Manifestations of Low Vitamin B12 Levels. Centers for Disease Control and Prevention. Jan 2015.


# Ascorbic Acid (Vitamin C)


- Least stable of all the vitamins when exposed to air and very sensitive to oxygen
- Maintain body's collagen, healing of wounds and burns, formation of RBC's and prevention of hemorrhages, cures viral/bacterial infections
- Used for the common cold and promotes bone and tooth formation
- Eyes = Fortifies sclera, cataracts
  - Take 500 mg (4x Day) Nourishes lens within the eye, fortifies blood vessel walls
    - Lens = 20x more Vit C than plasma
- Food = Green leafy vegetables, citrus fruits
  - 1 cup of OJ = 125 mg of Vit C
  - Grapefruit juice packs = 94 mg of Vit C
- Smoke, stress, high fever, antibiotics (prolonged use), painkillers lowers Vit C
- Severe deficiency = Scurvy
- RDA:
  - Adults = 45mg
  - Daily intake = 2,300 – 9,000 mg (Try not to go over 5,000)

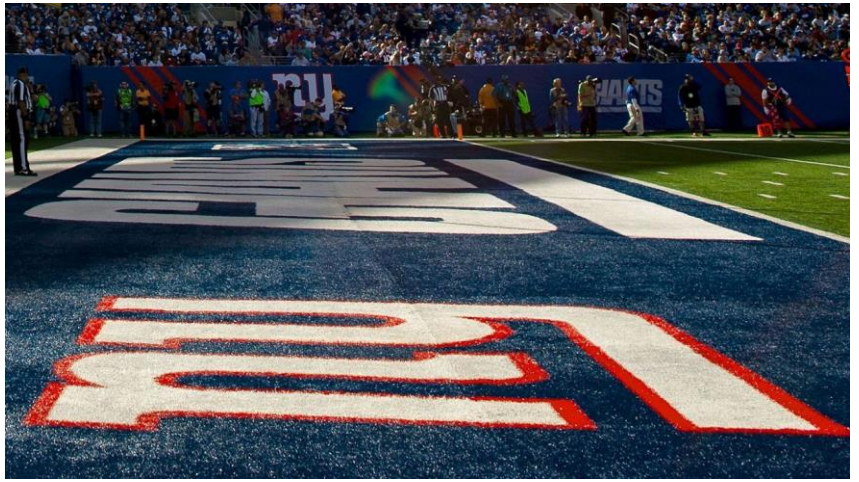

# Vitamin D


- “Sunshine” vitamin
- Normal growth in children, bone/teeth structure
- Normal heart action, stable nervous system, normal blood clotting
- Food = Salmon, cod liver oil, sardines, egg yolks, mushrooms
- Deficiency = Rickets (Bone disorder in children), Osteomalacia (Adults)
  - Poor, Less Educated, Obese, Current Smoker, Black, Physically inactive or an Infrequent milk drinker
- Eyes = May cause near-sightedness, keratoconus, pink eye, cataracts, dry eye, AMD, DR, glaucoma, retinoblastoma, uveitis
  - Cornea Endothelium, Ganglion cell layer, Retinal photoreceptors (All have Vit D receptors)
- RDA:
  - 400 IU per day = 10mcg
  - High as 2,000 IU per day = 50 mcg
  - Best utilized by the body if taken with Vitamin A

1 IU = .025mcg

# Vitamin D Deficiency & The N.Y. Giants

- Vit D Deficiency = Depression, decreased energy levels, low bone density, lowers immune system, severe asthma in children, cognitive impairment in older adults, cardiac complications and cancer
- Studies show 60% of American children have insufficient levels of Vit D and 9% are clinically deficient
- Studies in track and field and gymnastics all show some correlation between low Vit D and athletic performance!
- Fall 2010: Tested 90 players of the N.Y. Giants
  - 27 = Deficient levels (<20 ng/mL)
  - 45 = Insufficient levels (20-31.9 ng/mL)
  - 18 = Normal levels
  - Black Players Avg = 20.4 ng/mL
  - White Players Avg = 30.3 ng/mL
  - Players with muscle injury Avg = 19.9 ng/mL




# Vitamin E


- An antioxidant
- Cellular respiration of the muscles, dilation of blood vessels, lowers elevated blood pressure
- Helps with elevated scar tissue
  - Ointment form = Used on burns to promote healing, skin ulcers and abrasions, premature aging of the skin
- Beneficial to people with atherosclerosis, coronary thrombosis, angina, headaches, gout, varicose veins
- Eyes = Strabismus, nearsightedness, cataracts, AMD
  - Take 300-400 IU daily
- Food = Nuts, seeds (Chia, flax, hemp), almonds, vegetable oils, whole grain, broccoli, spinach
- When Iron and Vit E are administered together the absorption of both is impaired
- RDA:
  - Infants = 4-5 IU
  - Children/adolescents = 7-12 IU
  - Adult Females = 12 IU
  - Adult Males = 15 IU
  - Pregnant/Lactating = 15 IU
  - Daily dosage = 300-400 IU per day

1 IU = 0.67 mg for *d*-alpha-tocopherol (natural) / 0.9 mg for *dl*-alpha-tocopherol (synthetic)


- Often result in <u>deficiencies</u> of important nutrients[1]:
  - Vitamin B12
  - Vitamin D
  - Calcium
  - Iodine
  - Iron
  - Zinc
  - EPA/**<u>DHA</u>**

*All of these are needed for brain recovery, repair and optimization!*

Dwyer, J. “Nutiritional Consequences of Vegetarianism”, Review of Nutrition 11.1 (1991)

# Zinc

- Lost through sweating
- Muscle breakdown increased urinary zinc loss
- Zinc helps vitamins move from the liver into the retina to protect the eyes
- Food = Seafood, beef, oysters, liver, poultry, legumes, nuts/seeds, grains, chickpeas, whole grains
- Eyes = Cataracts, night blindness
  - Take 20 mg daily
- RDA:
  - Adults = 10-15 mg
  - Pregnant = 30 mg
  - Zinc Lozenge = 5-10 mg
  - DO NOT exceed more than 40 mg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# VITAMIN, MINERAL & NUTRITION TESTS

Thank you for shopping our vitamin, mineral and nutrition tests. Vitamins are essential to human life. Depleted levels of nutrients can lead to life threatening conditions and seriously limit the body's ability to fight off infection and disease. Vitamin and nutrition blood tests can detect gluten, mineral, iron, calcium and other deficiencies, telling you which vitamins you lack and which you are getting enough of through natural sources. Don't just take supplements, know how much and which ones you should be taking. For a cheap and convenient way to take control of your health, order online vitamin deficiency test or a nutrition blood tests or panels from Walk-In Lab.

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- LabCorp:
  - Online or lab testing prohibited: MA, MD, NY, NJ, RI
- Quest Diagnostics:
  - Online or lab testing prohibited: NY, NJ, RI
- Home Test Kits

# ELECTROLYTE BLOOD TEST PANEL



The Electrolyte Panel is performed to check for kidney problems, acids in your blood, a sodium or potassium problem and diabetes.



## Description

The electrolyte panel is used to identify an electrolyte, fluid, or pH imbalance in the blood.

An electrolyte blood test panel may be ordered as part of a routine screening or as a diagnostic aid when a person has signs and symptoms, such as:

- Fluid accumulation (edema)
- Nausea or vomiting
- Weakness
- Confusion
- Irregular heart beat (cardiac arrhythmias)

Electrolyte measurements may be used to help investigate conditions that cause electrolyte imbalances such as dehydration, kidney disease, lung diseases, or heart conditions.

Test Includes: Carbon dioxide; chloride; potassium; sodium.

# VITAMINS BLOOD TEST PANEL

Email Share Tweet Pin

The Vitamins Blood Test Panel includes a Vitamins A, B1, B6, B9(Folic Acid), B12, C, D,E, and K1.

## LabCorp

Buy LabCorp: $350.00 Sample Report

Add To Wishlist Compare

**Test Code:** 1971

**Also Known As:**

**Methodology:** See Individual Test

**Preparation:** Fasting for 12 hours is required. Refrain from taking vitamin C supplements, fruits, and alcohol 24 hours before the collection and biotin for at least 72 hours prior to the collection. Must draw before Schilling test, transfusions or B12 therapy is started.

**Test Results:** 7-10 days. May take longer based on weather, holiday or lab delays.

## Quest

Buy Quest: $450.00 Sample Report

Add To Wishlist Compare

**Test Code:** 2273

**Also Known As:**

**Methodology:** See Individual Test

**Preparation:** Fasting for 12 hours is required. Refrain from taking vitamin C supplements, fruits, and alcohol 24 hours before the collection and biotin for at least 72 hours prior to the collection. Must draw before Schilling test, transfusions or B12 therapy is started.

**Test Results:** 10 days. May take longer based on weather, holiday or lab delays.

# VITAMIN DEFICIENCY AND WELLNESS BLOOD TEST PANEL

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The Vitamin Deficiency and Wellness Blood Test Panel includes a Glucose, BUN, Crea
Total Globulin, Albumin, Total Bilirubin, Albumin/Globulin Ratio, Total Cholesterol/HDL F

LabCorp

Buy LabCorp: $169.00 | Sample Report

Add To Wishlist | Compare

**Test Code:** 1032

**Also Known As:**

**Methodology:** See Individual Test

**Preparation:** Patient should be on a stable diet, ideally for two to three weeks prior to collection of blood, and should fast for 12 to 14 hours before collection of the specimen. Stop biotin consumption at least 72 hours prior to the collection. Must draw before Schilling test, transfusions or B12 therapy is started.

**Test Results:** 3-5 days. May take longer based on weather, holiday or lab delays.

LabCorp — Patient Report

Specimen ID:
Control ID:

Acct #: 17452095
Walk-In Lab, LLC
VART verified
169 W Augusta Lane
SLIDELL, LA 70458

Phone: (800) 539-6119 Rte: 00

**Patient Details**
DOB:
Age(y/m/d):
Gender: SSN:
Patient ID:

**Specimen Details**
Date collected:
Date entered:
Date reported:

**Physician Details**
Ordering: J BHAN
Referring:
ID: 1841295896
NPI: 1841295896

**General Comments & Additional Information**
**Alternate Control Number:**
**Total Volume:** Not Provided
**Alternate Patient ID:** Not Provided
**Fasting:** Yes

**Ordered Items**
CBC With Differential/Platelet; Comp. Metabolic Panel (14); Lipid Panel w/ Chol/HDL Ratio; Folate (Folic Acid), Serum; Vitamin D, 25-Hydroxy; Vitamin B12; Magnesium, Serum; Venipuncture

| TESTS | RESULT | FLAG | UNITS | REFERENCE INTERVAL | LAB |
|---|---|---|---|---|---|
| CBC With Differential/Platelet | | | | | |
| WBC | 5.7 | | x10E3/uL | 3.4 - 10.8 | 01 |
| RBC | 4.31 | | x10E6/uL | 3.77 - 5.28 | 01 |
| Hemoglobin | 13.1 | | g/dL | 11.1 - 15.9 | 01 |
| Hematocrit | 39.4 | | % | 34.0 - 46.6 | 01 |
| MCV | 91 | | fL | 79 - 97 | 01 |
| MCH | 30.4 | | pg | 26.6 - 33.0 | 01 |
| MCHC | 33.2 | | g/dL | 31.5 - 35.7 | 01 |
| RDW | 13.4 | | % | 12.3 - 15.4 | 01 |
| Platelets | 270 | | x10E3/uL | 150 - 379 | 01 |
| Neutrophils | 51 | | % | | 01 |
| Lymphs | 39 | | % | | 01 |
| Monocytes | 7 | | % | | 01 |
| Eos | 2 | | % | | 01 |
| Basos | 1 | | % | | 01 |
| Neutrophils (Absolute) | 2.9 | | x10E3/uL | 1.4 - 7.0 | 01 |
| Lymphs (Absolute) | 2.2 | | x10E3/uL | 0.7 - 3.1 | 01 |
| Monocytes(Absolute) | 0.4 | | x10E3/uL | 0.1 - 0.9 | 01 |
| Eos (Absolute) | 0.1 | | x10E3/uL | 0.0 - 0.4 | 01 |
| Baso (Absolute) | 0.0 | | x10E3/uL | 0.0 - 0.2 | 01 |
| Immature Granulocytes | 0 | | % | | 01 |
| Immature Grans (Abs) | 0.0 | | x10E3/uL | 0.0 - 0.1 | 01 |
| Comp. Metabolic Panel (14) | | | | | |
| Glucose, Serum | 92 | | mg/dL | 65 - 99 | 01 |
| BUN | 15 | | mg/dL | 6 - 24 | 01 |
| Creatinine, Serum | 0.85 | | mg/dL | 0.57 - 1.00 | 01 |
| eGFR If NonAfricn Am | 84 | | mL/min/1.73 | >59 | |
| eGFR If Africn Am | 96 | | mL/min/1.73 | >59 | |

# ELITE ATHLETE METRICS SALIVA AND BLOODSPOT PROFILE - ZRT TEST KIT



The Elite Athlete Metrics Profile allows identification of hormone imbalances or vitamin D deficiency that can affect performance, increase injury risk, or prevent an athlete from competing at their highest level.

## Home Test Kit: ZRT

Buy ZRT: $349.00

Add To Wishlist Compare

**Test Code:** ZRTEAM

**Also Known As:**

**Methodology:**

**Preparation:** 10-12 hours fasting is required. Please read patient instructions very carefully and decide the ideal day for you to begin test. Do not eat, drink (except water) or brush your teeth prior to your first collection of the day and for the 2 hours prior to collecting throughout the day. Avoid anti-aging/anti-wrinkle facial creams for 3 days prior to testing as they may contain undisclosed hormones.

**Test Results:** 5-7 Days once the lab receives the specimen. May take longer based on weather, holiday or lab delays.

Estradiol, Progesterone, Testosterone, DHEA-S, Cortisol x4, TSH, Free T3, Free T4, TPOab, and Vitamin D.

Who benefits from Elite Athlete Profile Testing?

Individuals who:

- Train for competitions
- Compete at a high level
- Feel like they are “hitting a wall”
- Suffer from nagging or persistent injuries
- Are interested in seeing how their workouts affect their hormones

# Astaxanthin

- Red-Orange carotenoid pigment which occurs in trout, shrimp, lobster, fresh water algae and other sea creatures
  - Normally found in Pacific salmon
- Health Benefits:
  1. Antioxidant
  2. Eye Health: Macular degeneration, cataracts, glaucoma, eye fatigue/strain[1,2]
     - Received astaxanthin each day for one month had a 54% reduction in complaints of eye fatigue, along with improvements in accommodation
  3. Brain Health: Slows/stops chronic neurodegenerative disease (Alzheimer's or Parkinson's)
  4. Gastric Health: Fights off Helicobacter pylori (H. pylori) (Ex: Gastric cancer, chronic gastritis
  5. Benefits for treatment of breast cancer/reduced growth of breast cancer cells
  6. Skin Health: Helps smooth wrinkles, age spots smaller, moisture to skin
  7. Sports Health: Helps endurance and prevent muscle and skeletal damage
  8. Heart Health: Lowers cholesterol and lowers cardiovascular damage
  9. Joint Pain (Ex: R.A., Carpel tunnel syndrome)
  10. Male Fertility:  Improved count and motility

1. Chitchumroonchokchai C, Bomser JA, Glamm JE, Failla ML. Xanthophylls and alpha-tocopherol decrease UVB-induced lipid peroxidation and stress signaling in human lens epithelial cells. J Nutr. 2004 Dec;134(12):3225-32.
2. Cort A, Ozturk N, Akpinar D, et al. Suppressive effect of astaxanthin on retinal injury induced by elevated intraocular pressure. Regul Toxicol Pharmacol. 2010 Oct;58(1):121-30.

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Forum Nutr. 2009;61:129-135. doi: 10.1159/000212745. Epub 2009 Apr 7.

# Astaxanthin protects neuronal cells against oxidative damage and is a potent candidate for brain food

Xuebo Liu, Toshihiko Osawa

PMID: 19367117 DOI: 10.1159/000212745

- Dosages: Safe (No side effects reported)
  - Eyes: As little as **4-6 mg** per day
  - Metabolic Syndrome: Between **6-18 mg** per day
  - H. pylori-induced gastritis: As much as **40 mg per** day

6 oz of Salmon = 3.6 mg Astaxanthin

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28048972

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Brain Res. 2017 Mar 15;1659:88-95. doi: 10.1016/j.brainres.2016.12.031. Epub 2016 Dec 31.

# Astaxanthin improves cognitive performance in mice following mild traumatic brain injury

Xinran Ji [1], Dayong Peng [2], Yiling Zhang [1], Jun Zhang [1], Yuning Wang [1], Yuan Gao [1], Ning Lu [3], Peifu Tang [4]

Affiliations + expand

PMID: 28048972 DOI: 10.1016/j.brainres.2016.12.031

**Results:**

- 25 or 75mg for 28 days improved sensorimotor performance on Neurological Severity Score
- Enhanced cognitive function recovery
- Reduced lesion size and neuronal loss in the cortex
- Restored levels of BDNF

Review > Molecules. 2019 Jul 20;24(14):2640. doi: 10.3390/molecules24142640.

# The Neuroprotective Effects of Astaxanthin: Therapeutic Targets and Clinical Perspective

Sajad Fakhri [1], Ina Yosifova Aneva [2], Mohammad Hosein Farzaei [3], Eduardo Sobarzo-Sánchez [4 5]

Affiliations + expand

PMID: 31330843 PMCID: PMC6680436 DOI: 10.3390/molecules24142640

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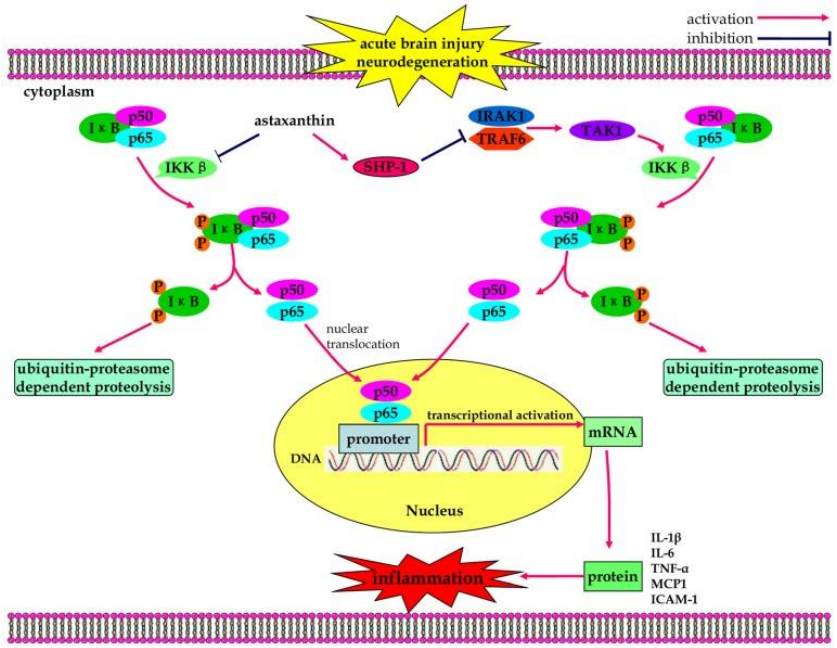


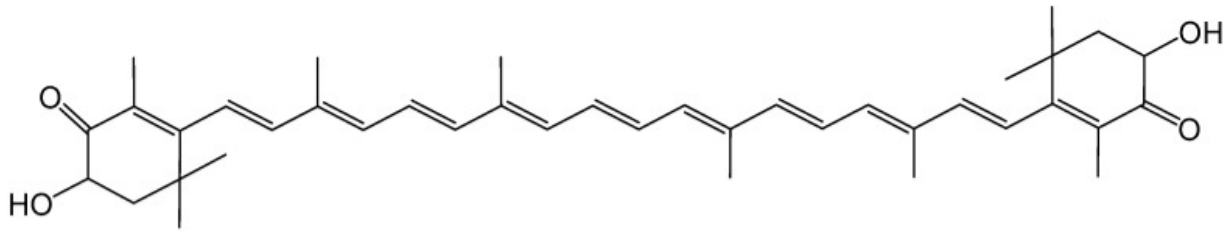


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Review > Mar Drugs. 2015 Sep 11;13(9):5750-66. doi: 10.3390/md13095750.

# Astaxanthin as a Potential Neuroprotective Agent for Neurological Diseases

Haijian Wu [1], Huanjiang Niu [2], Anwen Shao [3], Cheng Wu [4], Brandon J Dixon [5], Jianmin Zhang [6], Shuxu Yang [7], Yirong Wang [8]

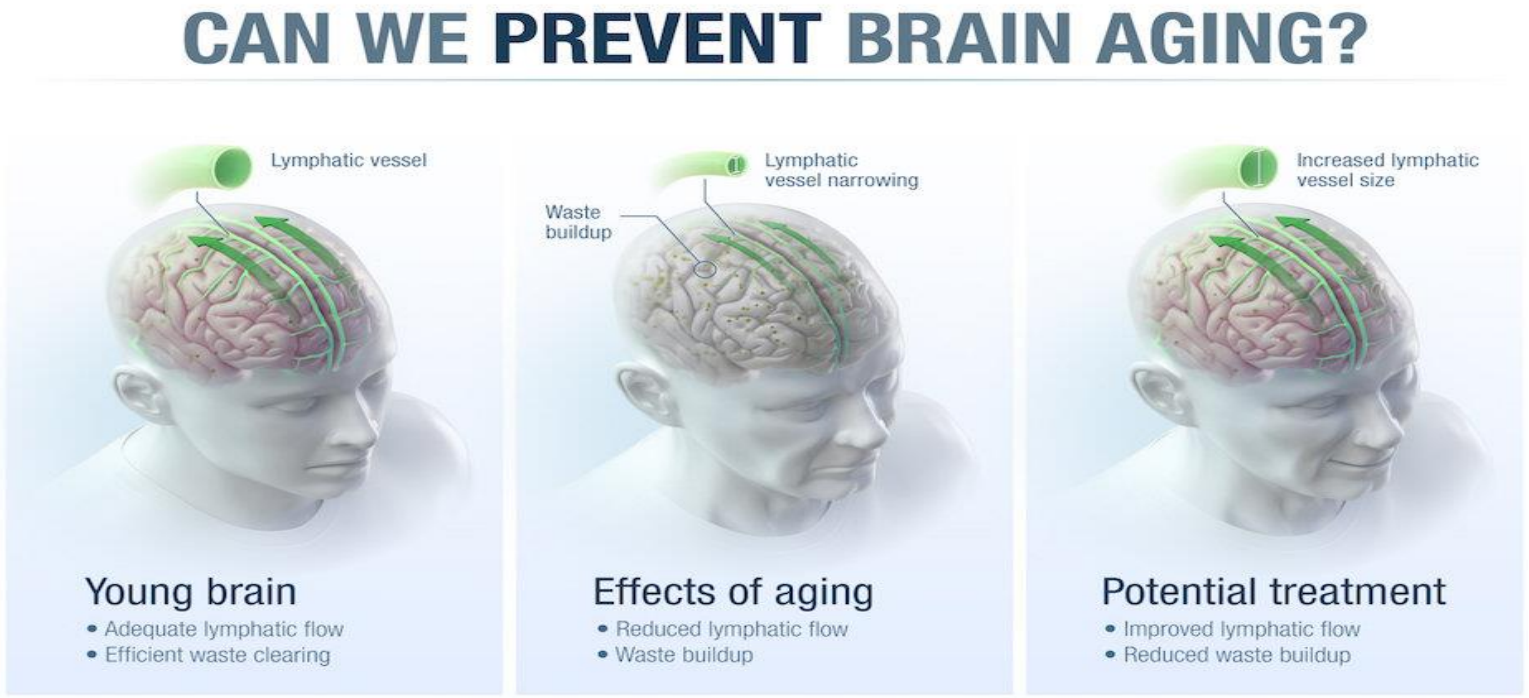
Affiliations + expand

PMID: 26378548 PMCID: PMC4584352 DOI: 10.3390/md13095750

Free PMC article

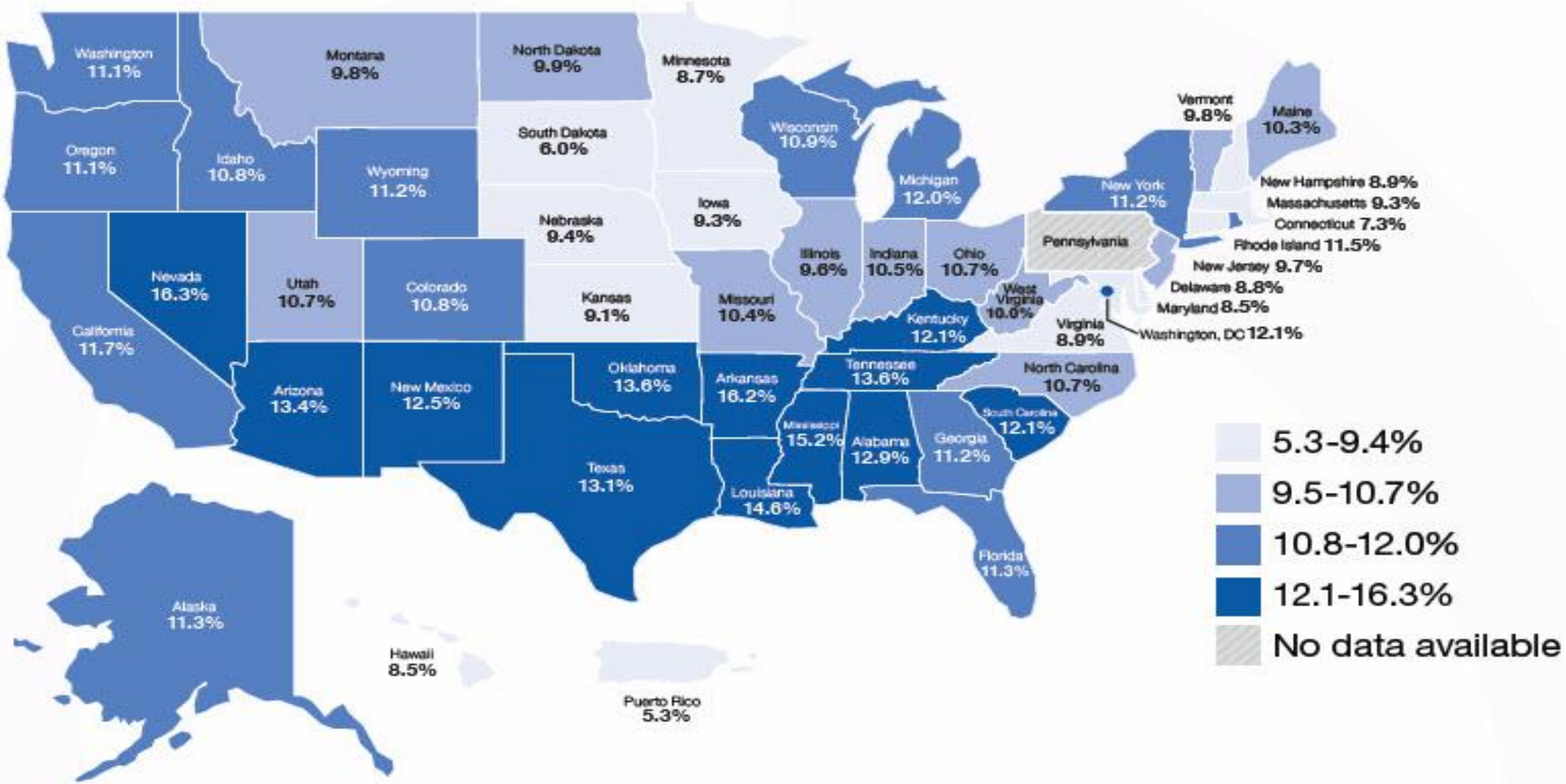
# Cognitive Decline

- Stats:
  - 1:9 > 65 yo experience cognitive decline
  - 40% had to give up day to day activities
  - 81% have at least one chronic condition
  - 41% need help with household tasks
- Factors:
  - Poor Sleep
  - Poor diet
  - Hypertension
  - Insulin Resistance
  - Inflammation
  - Stress
  - Lack of exercise
  - Toxins
  - Social Isolation
  - Lack of Nutrients



# Prevalence of Subjective Cognitive Decline in the U.S.

**Figure 1:** Adults 45 years of age and older with Subjective Cognitive Decline



frontiers in Neurology

Front Neurol. 2014; 5: 43.
Published online 2014 Apr 4. doi: 10.3389/fneur.2014.00043

PMCID: PMC3983497
PMID: 24772103

# The Gastrointestinal Tract Microbiome and Potential Link to Alzheimer's Disease

James M. Hill,[1,2,3] Surjyadipta Bhattacharjee,[1] Aileen I. Pogue,[4] and Walter J. Lukiw[1,3,4,5,*]

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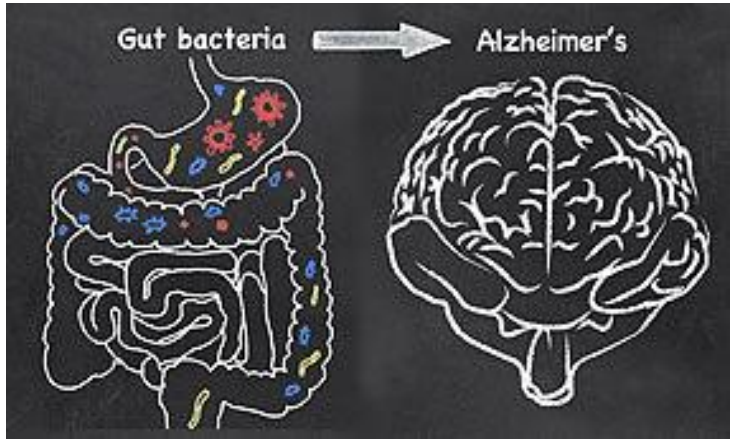
**Results:**

- Good gut bacteria produces BDNF, GABA, Glutamate
- Decreased levels of BDNF are found in:
  - Alzheimer's
  - Epilepsy
  - Anorexia nervosa
  - Depression
  - Schizophrenia
  - OCD



JAMA Neurol. 2014 Jan;71(1):55-61. doi: 10.1001/jamaneurol.2013.4781.

# Serum brain-derived neurotrophic factor and the risk for dementia: the Framingham Heart Study

Galit Weinstein [1], Alexa S Beiser [2], Seung Hoan Choi [3], Sarah R Preis [4], Tai C Chen [5], Demetrios Vorgas [5], Rhoda Au [1], Aleksandra Pikula [1], Philip A Wolf [1], Anita L DeStefano [2], Ramachandran S Vasan [1], Sudha Seshadri [1]

Affiliations + expand

PMID: 24276217 PMCID: PMC4056186 DOI: 10.1001/jamaneurol.2013.4781

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## Abstract

**Importance:** In animal studies, brain-derived neurotrophic factor (BDNF) has been shown to impact neuronal survival and function and improve synaptic plasticity and long-term memory. Circulating BDNF levels increase with physical activity and caloric restriction, thus BDNF may mediate some of the observed associations between lifestyle and the risk for dementia. Some prior studies showed lower circulating BDNF in persons with Alzheimer disease (AD) compared with control participants; however, it remains uncertain whether reduced levels precede dementia onset.

**Study:**

- 2,131 adults
- Free of dementia at the start and were followed up after 10 years

**Results:**

- Individuals with the highest levels of BDNF has less than half the risk of dementia
- Findings suggest = Role for BDNF can prevent dementia and Alzheimer's disease

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> J Neuroinflammation. 2008 Aug 29;5:37. doi: 10.1186/1742-2094-5-37.

# Neuro-inflammation induced by lipopolysaccharide causes cognitive impairment through enhancement of beta-amyloid generation

Jae Woong Lee [1], Yong Kyung Lee, Dong Yeon Yuk, Dong Young Choi, Sang Bae Ban, Ki Wan Oh, Jin Tae Hong

Affiliations + expand

PMID: 18759972 PMCID: PMC2556656 DOI: 10.1186/1742-2094-5-37

Free PMC article

ELSEVIER

Brain, Behavior, and Immunity

Volume 20, Issue 1, January 2006, Pages 64-71


# Peripheral immune activation by lipopolysaccharide decreases neurotrophins in the cortex and hippocampus in rats

Zhiwei Guan, Jidong Fang

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**Results:**

- Injections of LPS animals' bodies lead to overwhelming learning deficits
- Rats developed elevated levels of Beta-Amyloid in their hippocampus
- Severe memory problems
- LPS shown to decrease production of BDNF

J Neuroimmunol. Author manuscript; available in PMC 2010 Dec 1.
*Published in final edited form as:*
J Neuroimmunol. 2009 Jan 3; 206(1-2): 121–124.
Published online 2008 Nov 14. doi: 10.1016/j.jneuroim.2008.09.017

PMCID: PMC2995297
NIHMSID: NIHMS92741
PMID: 19013651

# Circulating endotoxin and systemic immune activation in sporadic Amyotrophic Lateral Sclerosis (sALS)

Rongzhen Zhang,[a] Robert G. Miller,[b] Ron Gascon,[a] Stacey Champion,[b] Jonathan Katz,[b] Mariselle Lancero,[a] Amy Narvaez,[a] Ronald Honrada,[a] David Ruvalcaba,[a] and Michael S. McGrath[a]



**Results:**

There is 3x as much LPS in the plasma of Alzheimer's patients as in healthy controls

frontiers in Cellular Neuroscience

Front Cell Neurosci. 2019; 13: 363.
Published online 2019 Aug 7. doi: 10.3389/fncel.2019.00363

PMCID: PMC6692714
PMID: 31440144

# Brain-Derived Neurotrophic Factor: A Key Molecule for Memory in the Healthy and the Pathological Brain

Magdalena Miranda, Juan Facundo Morici, María Belén Zanoni, and Pedro Bekinschtein*

▸ Author information ▸ Article notes ▸ Copyright and License information Disclaimer

# Effect of Astaxanthin on the Patients With Alzheimer Disease

Evid Based Complement Alternat Med. 2011; 2011: 164139.
Published online 2011 Aug 18. doi: 10.1155/2011/164139
PMCID: PMC3166615
PMID: 21941584

# Examining Brain-Cognition Effects of Ginkgo Biloba Extract: Brain Activation in the Left Temporal and Left Prefrontal Cortex in an Object Working Memory Task

R. B. Silberstein,[1] A. Pipingas,[1] J. Song,[1] D. A. Camfield,[1] P. J. Nathan,[2] and C. Stough[1,*]

▸ Author information ▸ Article notes ▸ Copyright and License information Disclaimer



BMC Geriatr. 2010; 10: 14.
Published online 2010 Mar 17. doi: 10.1186/1471-2318-10-14
PMCID: PMC2846949
PMID: 20236541

# Effects of Ginkgo biloba in dementia: systematic review and meta-analysis

Stefan Weinmann,[✉1] Stephanie Roll,[1] Christoph Schwarzbach,[2] Christoph Vauth,[2] and Stefan N Willich[1]

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- **Ginkgo Biloba Results:**
  - Supports healthy blood flow to the brain
  - Support a healthy inflammation response
  - Supports the production of important brain-building factors
  - Supports recovery from heavy metal/mold exposure
  - Supports healthy blood flow
  - Supports the brain's repair from physical trauma
  - Helpful with working memory deficits in the elderly

Annals of Indian Academy of Neurology
Official Journal of Indian Academy of Neurology
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Ann Indian Acad Neurol. 2008 Jan-Mar; 11(1): 13–19.
doi: 10.4103/0972-2327.40220
PMCID: PMC2781139
PMID: 19966973

# The effect of curcumin (turmeric) on Alzheimer's disease: An overview

Shrikant Mishra and Kalpana Palanivelu

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Meta-Analysis > Nutr Res. 2019 Sep;69:1-8. doi: 10.1016/j.nutres.2019.05.001. Epub 2019 May 9.

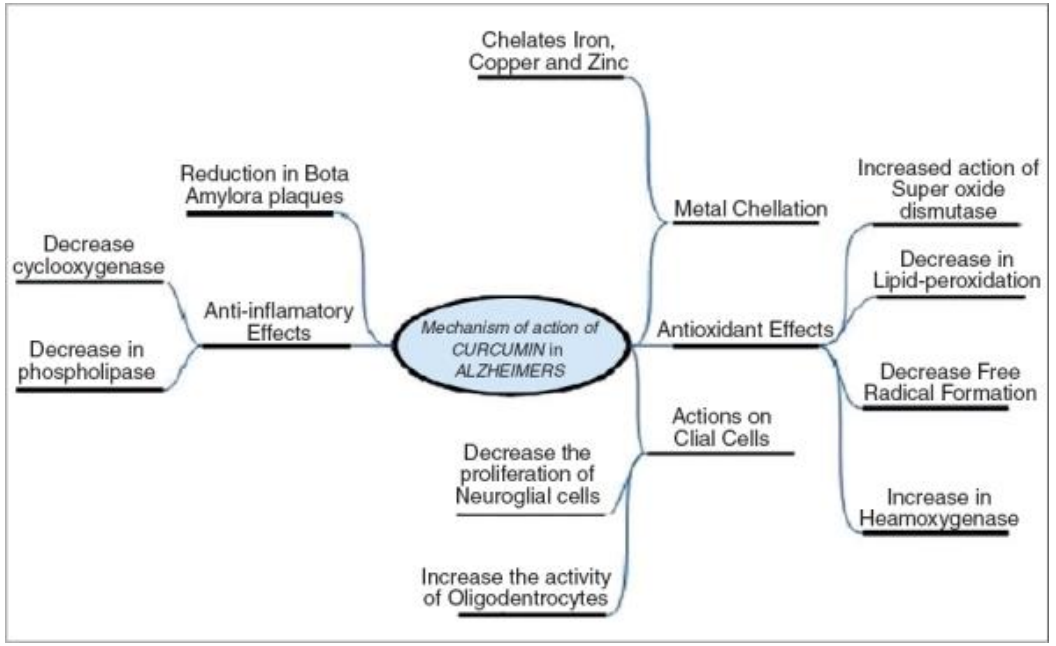
# Short-term curcumin supplementation enhances serum brain-derived neurotrophic factor in adult men and women: a systematic review and dose-response meta-analysis of randomized controlled trials

Payam Sarraf [1], Mohammad Parohan [2], Mohammad Hassan Javanbakht [3], Sakineh Ranji-Burachaloo [4], Mahmoud Djalali [5]

Affiliations + expand

PMID: 31279955 DOI: 10.1016/j.nutres.2019.05.001

- **Curcumin Results:**
  - Has anti-cancer properties
  - Supports a healthy inflammatory response
  - Provides brain-building compounds
  - Helps support detoxification from heavy metal and mold exposure



Randomized Controlled Trial

> Neuropsychol Dev Cogn B Aging Neuropsychol Cogn. 2020 Nov;27(6):918-934.
doi: 10.1080/13825585.2019.1702622. Epub 2019 Dec 12.

Alzheimer's Drug Discovery Foundation | Cognitive Vitality.org

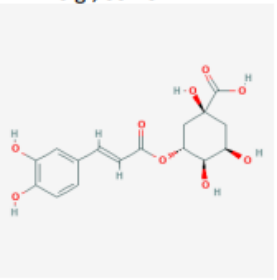
Last updated on December 6, 2018

# Cognitive short- and long-term effects of coffee cherry extract in older adults with mild cognitive decline

Jennifer L Robinson [1 2 3 4], John M Hunter [5], Tania Reyes-Izquierdo [6], Ruby Argumedo [6], Jessica Brizuela-Bastien [7], Robert Keller [8], Zbigniew J Pietrzkowski [6]

Affiliations + expand

PMID: 31829793 DOI: 10.1080/13825585.2019.1702622

| | | |
|---|---|---|
| **Availability**: OTC, most studies have used the Coffeeberry® product from FutureCeuticals Inc. | **Dose**: 100 mg of whole coffee fruit concentrate powder increased plasma BDNF. | **Chemical formula:** e.g., $C_{16}H_{18}O_9$<br>**MW**: e.g., 354.311<br>  <br>Source: PubChem |
| **Half life**: unknown | **BBB**: chlorogenic acid and/or its metabolites appear to reach the brain in mice, but bioavailability data is conflicting | |
| **Clinical trials**: Only one clinical trial has been carried out, which included 25 healthy adults. | **Observational studies**: none | |

- **Coffee Fruit Extract Results:**
  - Fuels brain-derived neurotrophic factor (BDNF), which boosts nerve transmission
  - Helps support a healthy blood sugar response and increases the brain's production of key building factors
  - 100-800mg well tolerated
  - Consumed for 28 days significantly reduced reaction time

Review > Nutrition. 2015 Jun;31(6):781-6. doi: 10.1016/j.nut.2014.10.014. Epub 2014 Nov 4.

# Phosphatidylserine and the human brain

Michael J Glade [1], Kyl Smith [2]

Affiliations + expand

PMID: 25933483 DOI: 10.1016/j.nut.2014.10.014

## Abstract

**Objective:** The aim of this study was to assess the roles and importance of phosphatidylserine (PS), an endogenous phospholipid and dietary nutrient, in human brain biochemistry, physiology, and function.

**Methods:** A scientific literature search was conducted on MEDLINE for relevant articles regarding PS and the human brain published before June 2014. Additional publications were identified from references provided in original papers; 127 articles were selected for inclusion in this review.

**Results:** A large body of scientific evidence describes the interactions among PS, cognitive activity, cognitive aging, and retention of cognitive functioning ability.

**Conclusion:** Phosphatidylserine is required for healthy nerve cell membranes and myelin. Aging of the human brain is associated with biochemical alterations and structural deterioration that impair neurotransmission. Exogenous PS (300-800 mg/d) is absorbed efficiently in humans, crosses the blood-brain barrier, and safely slows, halts, or reverses biochemical alterations and structural deterioration in nerve cells. It supports human cognitive functions, including the formation of short-term memory, the consolidation of long-term memory, the ability to create new memories, the ability to retrieve memories, the ability to learn and recall information, the ability to focus attention and concentrate, the ability to reason and solve problems, language skills, and the ability to communicate. It also supports locomotor functions, especially rapid reactions and reflexes.

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**Aging and related health concerns:** No clear rationale or data. One study reported a minor increase in mobility in elderly, but effect can't be clearly tied to phosphatidylserine.

- 0 meta-analyses
- 1 clinical trial on mobility
- 0 preclinical studies on longevity, mortality, etc.

Evid Based Complement Alternat Med. 2016; 2016: 2795915.
Published online 2016 Jun 1. doi: 10.1155/2016/2795915
PMCID: PMC4908235
PMID: 27340413

## Effectiveness of Gotu Kola Extract 750 mg and 1000 mg Compared with Folic Acid 3 mg in Improving Vascular Cognitive Impairment after Stroke

Kun Marisa Farhana, Rusdy Ghazali Malueka, Samekto Wibowo, and Abdul Gofir *



Indian Journal of Pharmaceutical Sciences
Home Current issue Instructions Archives

Indian J Pharm Sci. 2010 Sep-Oct; 72(5): 546–556.
doi: 10.4103/0250-474X.78519
PMCID: PMC3116297
PMID: 21694984

## Pharmacological Review on *Centella asiatica*: A Potential Herbal Cure-all

Kashmira J. Gohil,* Jagruti A. Patel, and Anuradha K. Gajjar[1]



- **Gotu Kola Results:**
  - Concluded that a Gotu Kola extract therapy of 1000 mg/day and 750 mg/day is effective in improving cognitive impairment after stroke infarction but is not more beneficial than a therapy of folic acid 3 mg/day
  - Gotu Kola treatment showed better improvement in delayed memory recall compared with folic acid treatment

Oxidative Medicine and Cellular Longevity

Oxid Med Cell Longev. 2017; 2017: 7984327.
Published online 2017 Feb 6. doi: 10.1155/2017/7984327
PMCID: PMC5317132
PMID: 28265338

## The Neuroprotective Effects of Brazilian Green Propolis on Neurodegenerative Damage in Human Neuronal SH-SY5Y Cells

Junjun Ni,[1] Zhou Wu,[1,2,*] Jie Meng,[1] Aiqin Zhu,[3] Xin Zhong,[3] Shizheng Wu,[3] and Hiroshi Nakanishi[1]

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Hindawi

Evid Based Complement Alternat Med. 2021; 2021: 6664217.
Published online 2021 Feb 24. doi: 10.1155/2021/6664217
PMCID: PMC7929669
PMID: 33680059

## Cognitive Improvement and Safety Assessment of a Dietary Supplement Containing Propolis Extract in Elderly Japanese: A Placebo-Controlled, Randomized, Parallel-Group, Double-Blind Human Clinical Study

Takashi Asama,[1] Toshihito Hiraoka,[1] Akio Ohkuma,[2] Nobuaki Okumura,[1] Ayanori Yamaki,[1] and Katsuya Urakami[3]

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- **Propolis Results:**
  - Brazilian green propolis could reduce oxidative stress and prevent the neurodegenerative damaged synapse efficacy
  - Propolis intake improves not only verbal memory but also information processing, attention, and concentration in a group with high cognitive function.
  - No side effects were shown by propolis ingestion = Very safe food

Biomedicines. 2021 Sep 29;9(10):1348. doi: 10.3390/biomedicines9101348.

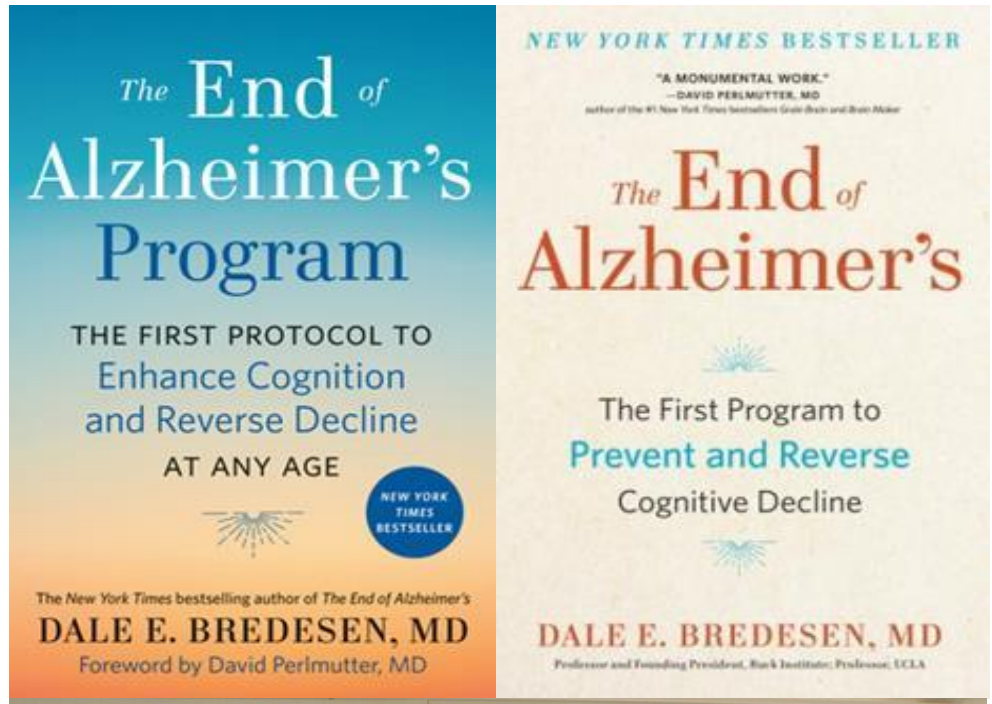
# ReCODE: A Personalized, Targeted, Multi-Factorial Therapeutic Program for Reversal of Cognitive Decline

Rammohan V Rao [1], Sharanya Kumar [2], Julie Gregory [1], Christine Coward [1], Sho Okada [1], William Lipa [1], Lance Kelly [1], Dale E Bredesen [1 3]

Affiliations + expand

PMID: 34680464 PMCID: PMC8533598 DOI: 10.3390/biomedicines9101348

Free PMC article




## Abstract

**Background:** Alzheimer's disease (AD) is the major cause of age-associated cognitive decline, and in the absence of effective therapeutics is progressive and ultimately fatal, creating a dire need for successful prevention and treatment strategies. We recently reported results of a successful proof-of-concept trial, using a personalized, precision medicine protocol, but whether such an approach is readily scalable is unknown.

# Healthy Vision Grocery List

| Lutein & Zeaxanthin |
| --- |
| Arugula |
| Broccoli |
| Celery |
| Collard Greens |
| Corn |
| Cucumber |
| Egg Yolks |
| Kale |
| Oranges |
| Peas |
| Pistachios |
| Spinach |
| Summer Squash |
| Turnip Greens |

| Beta-Carotene |
| --- |
| Apricots |
| Butternut Squash |
| Cantaloupe |
| Carrots |
| Kale |
| Red Peppers |
| Sweet Potatoes |

| Vitamin C |
| --- |
| Brussel Sprouts |
| Cabbage |
| Grapefruit/OJ |
| Kiwi |
| Papaya |
| Strawberries |

| Vitamin E |
| --- |
| Almonds |
| Hazelnuts |
| Mangos |
| Peanut Butter |
| Sunflower Seeds/Oil |
| Wheat Germ |

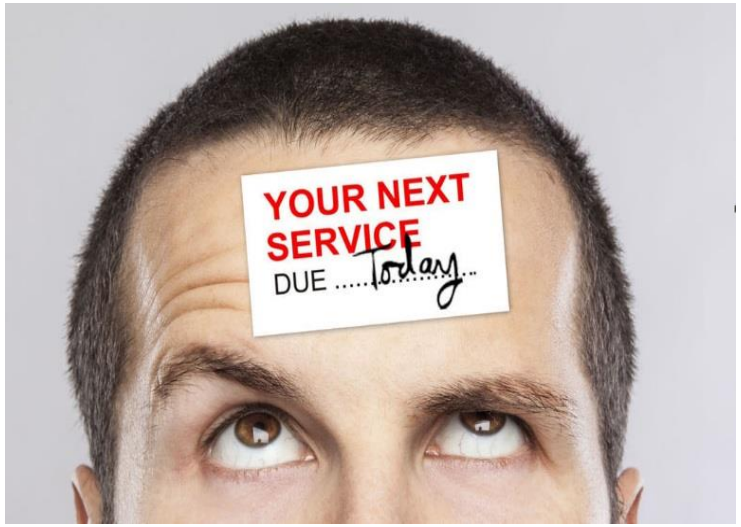
| Zinc |
| --- |
| Beans |
| Beef |
| Cashews |
| Crab |
| Dark Meat Chicken |
| Fortified Cereal |
| Milk |
| Oysters |
| Peanuts |
| Pork |

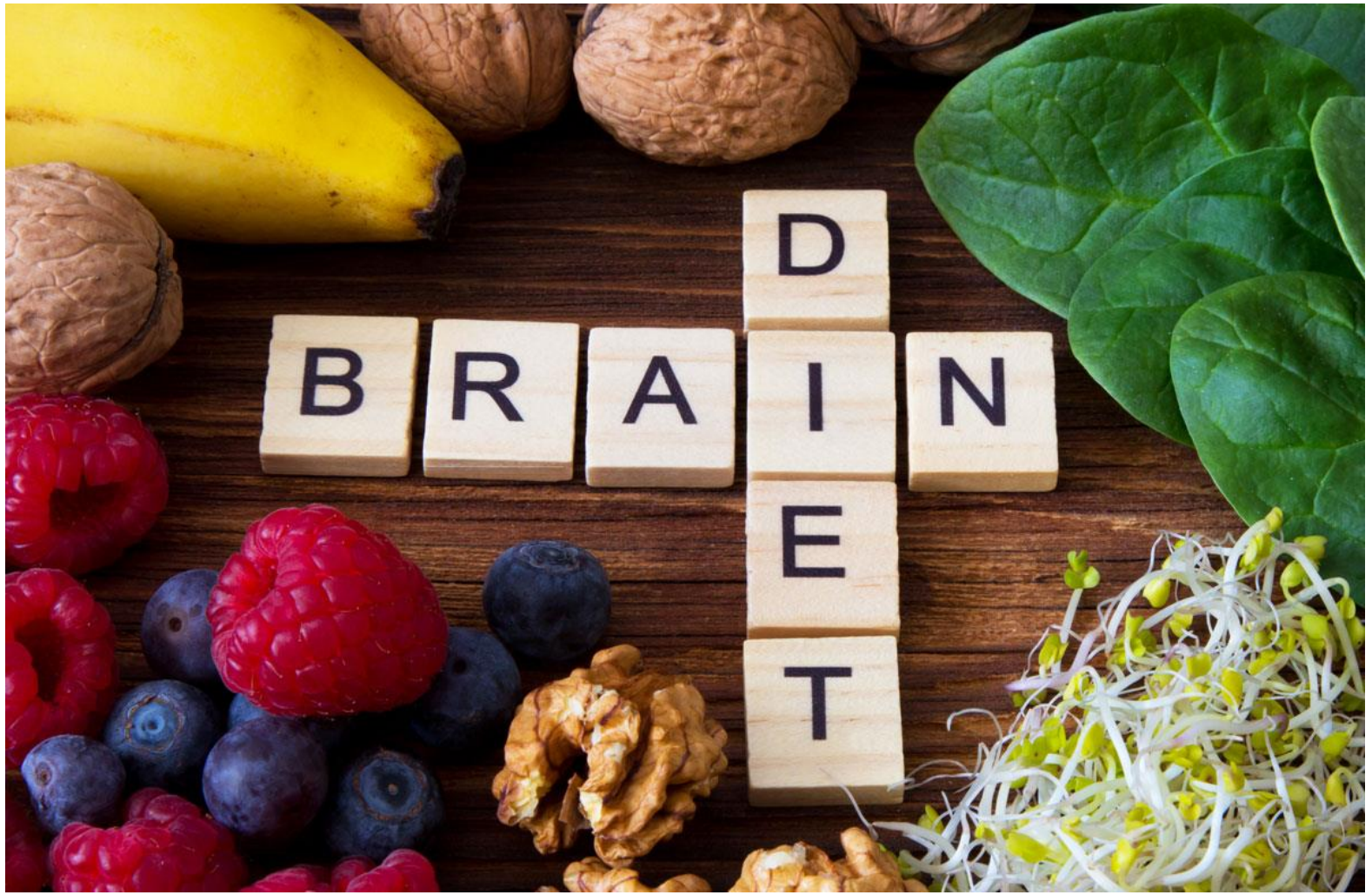
| Omega-3 FA |
| --- |
| Anchovies |
| Bluefish |
| Avocado Oil |
| Flax Seed |
| Herring |
| Salmon |
| Sardines |
| Scallops |
| Tuna |
| Walnuts |

# Summary

- Do not depend on the current health care model or wait until you have advanced symptoms before taking action:
  - No one will care as much about your brain as much as you do!
    - You hold the keys to your own brain health… YOU CAN DO THIS!!!
- An investment in good sleep is an investment in a healthy gut!
- Our BRAIN is our GARDEN and the ROOTS are nurtured by the FOOD we eat!

# THANK YOU!

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