

RE·CODE®

REPORT ➔

PARTICIPANT REPORT

REPORT DATE: MARCH 1, 2023

PARTICIPANT:

GEORGI MARKOV





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UNDERSTANDING YOUR RESULTS YOUR RECODE JOURNEY

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Welcome to the ReCODE Community

Imagine a world in which Alzheimer's disease is a very rare condition. Thankfully, this is no longer a fantasy, it is in the works – but it requires that all of us work together, for evaluation, prevention, and optimal treatment.



Thirty years ago, my laboratory team and I began research to determine whether we could understand the fundamental nature of neurodegeneration, in the hope of translating our results to develop the first effective treatment for cognitive decline. It took us quite a while, but in 2014, we reported the first reversals of cognitive decline in patients with Alzheimer's disease and pre-Alzheimer's (mild cognitive impairment, MCI). Since then, hundreds of patients have shown documented, sustained improvement, and we are currently in the midst of the first clinical trial of the protocol we developed, ReCODE (reversal of cognitive decline). We have an opportunity, for the first time, to reduce the global burden of dementia.

Why did ReCODE succeed when all other attempts at effective treatment had failed? ReCODE fundamentally changes the way we evaluate and treat cognitive decline: instead of a one-size-fits all treatment that has nothing to do with what is actually causing the cognitive decline, ReCODE evaluates the dozens of potential contributors and then generates a personalized, precision protocol that addresses the multiple contributors identified. Rarely do those of us with cognitive decline have only a single contributor – somewhat surprisingly, there are usually 10 or more. Therefore, the protocol addresses all of these, whether they include insulin resistance, neuroinflammation, specific pathogens, biotoxins, vascular compromise, sleep apnea, altered oral or gut microbiome, or other contributors.

I would like to congratulate you on your first critical step toward improving cognition and sustaining improvement for decades to come. What you will find here is not only a report that identifies and addresses your contributors to cognitive decline, but a whole community that is preventing and reversing cognitive decline. Your membership includes access to a portal with everything you need – access to the best trained physicians, brain health coaches, guides for optimal brain nutrition and sleep optimization (and more), town halls where you can submit questions, and a forum for discussions with other members. Let's work together to continue to optimize your results, since that will provide the best long-term outcome.

You might also notice something else – as you adopt ReCODE, you may well notice that your overall health improves. Many find their blood pressure improved, better lipid panels ("cholesterol"), improved glucose (blood sugar), more restorative sleep, better mood, and more energy.

Alzheimer's disease is a true scourge – one that, unfortunately, is on the rise. Diseases like tuberculosis, polio, and leprosy were scourges of the past. The program you are starting will help to make Alzheimer's disease a scourge of the past, as well.

Dale Bredesen, MD

Professor, Department of Molecular and Medical Pharmacology, UCLA
Founding President and Professor Emeritus, Buck Institute for Research on Aging
Chief Science Officer, Apollo Health
Author of the New York Times Bestseller, *The End of Alzheimer's*





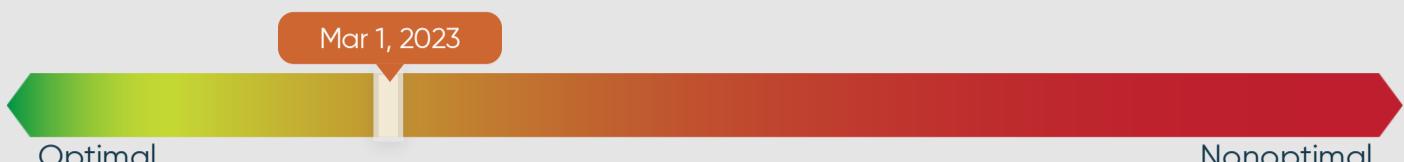
UNDERSTANDING YOUR RESULTS

YOUR COGNITIVE RISK FACTORS

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YOUR RE·CODE INDEX



TYPE 1	Inflammation	 Chronic inflammation, whether due to infections, leaky gut, poor diet, or other factors, is the key contributor to Type 1 Alzheimer's disease.
TYPE 3	Toxicity	 Some toxins are "dementogens" – they may cause dementia. Examples are some metals such as mercury, some organic chemicals, and some biotoxins such as mycotoxins (toxins produced by specific molds).
TYPE 4	Vasculature	 Vascular damage and poor blood flow are important contributors to type 4 Alzheimer's disease.
TYPE 2	Trophic Loss	 Reduction in hormonal, vitamin, nutrient, or growth factor support drives type 2 Alzheimer's disease.
TYPE 1.5	Glycotoxicity	 Sugar toxicity causes both inflammation and insulin resistance, and therefore contributes to both type 1 and type 2 Alzheimer's disease.
TYPE 5	Trauma	 Head trauma due to concussions or other injuries is an important contributor to type 5 Alzheimer's disease.

KEY METABOLIC DEFICIENCIES

- The legend consists of six entries, each with a colored square followed by the variable name:

 - hs-CRP (blue)
 - Zinc (orange)
 - Copper:Zinc ratio (green)
 - Homocysteine (red)
 - Thyroid (purple)
 - MMP9 (pink)



UNDERSTANDING YOUR RESULTS

THE SIX TYPES OF ALZHEIMER'S DISEASE

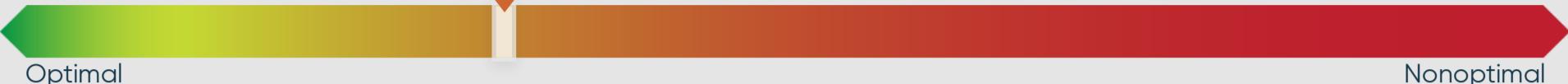
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TYPE
1

INFLAMMATION

Mar 1, 2023



Optimal

Nonoptimal

Chronic inflammation, whether due to infections, leaky gut, poor diet, or other factors, is the key contributor to Type 1 Alzheimer's disease.

This type is associated with inflammatory markers such as hs-CRP, and the inflammation may be due to infections (often unrecognized), leaky gut, suboptimal diet, or other factors. Risk for type 1 is increased by ApoE4, chronic infections, trans fats, damage to your gut microbiome, and other factors.

Let's see how you are doing with risk for inflammatory Alzheimer's, so that we can minimize this risk.

TYPE
1

Your Results

Your hs-CRP (high-sensitivity C-reactive protein, which is a measure of inflammation) was 1 mg/l, which is borderline – pretty good, but we can help you make it better – the goal is to see it at 0.7 or lower. This is important, because millions of people suffer from chronic inflammation, and this takes a toll, accelerating our aging (which is often called "inflamm-aging" because inflammation is such a common and important feature of aging), increasing risk for Alzheimer's, and increasing risk for other chronic illnesses such as vascular disease, arthritis, and cancer.

The information in the treatment section will help you to bring your inflammation down and keep it low for years to come, thus helping to reverse your cognitive decline. This includes keeping your gut healthy – avoiding "leaky gut" – keeping your oral health good (pathogens from dental disease, such as P. gingivalis, increase risk for Alzheimer's disease), treating pathogens you may get from ticks (such as Borrelia or Ehrlichia), treating viral outbreaks such as Herpes, and avoiding exposure to inflammatory toxins such as those from specific molds. The "B7" section offers the best approaches for staying healthy and avoiding chronic inflammation and its associated risks.

Although not quite as predictive of inflammation-related disease as hs-CRP, there are other markers that complement hs-CRP, such as A/G ratio (albumin to globulin ratio) and homocysteine. Your A/G ratio was 1.7, and the goal is to see this at 1.8 or above. High homocysteine may also be associated with inflammation, although it is most reflective of methylation (which is important in many processes, including detoxification pathways). The goal for homocysteine is 7 uM or lower. Your homocysteine was 8.3 uM.

In addition to these laboratory tests, your genetics can also influence your risk for Alzheimer's disease. The great news is that this can be countered very successfully. As an example, regular exercise reduces the risk of the most common genetic risk factor, which is ApoE4, back to normal.

So, let's look at your most important genetic risk factor: ApoE4. Each of us may have 0, 1, or 2 copies of ApoE4, and this is associated with low, moderate, or high risk for Alzheimer's disease. **Please remember that none of these guarantees that you won't get Alzheimer's or that you will, so even if you have 2 copies, being on a reversal program should allow you to start the reversal of your cognitive decline.** Indeed, there is a wonderful site – ApoE4.info – at which over 3000 individuals from all over the world, all ApoE4+, share information and share their best practices. Most of these individuals are on some variation of ReCODE or PreCODE.



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Your ApoE status is 1 copy, and this is associated with intermediate risk. There are 75 million Americans with 1 copy of ApoE4, nearly 7 million with 2 copies, and the rest – about 250 million Americans – with zero copies. Our goal is to have individuals with symptoms on a reversal program and asymptomatic individuals on a prevention program so that we can truly make Alzheimer's a rare disease.



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TYPE
1.5

GLYCOTOXICITY

Mar 1, 2023

Optimal

Nonoptimal

Sugar toxicity causes both inflammation and insulin resistance, and therefore contributes to both type 1 and type 2 Alzheimer's disease.

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, thus increasing risk for type 1. Meanwhile, the responding high insulin levels cause insulin resistance, reducing the trophic effects of insulin and increasing risk for type 2. Risk for type 1.5 is increased by ApoE4 and by type 2 diabetes and pre-diabetes.

Let's look at where you stand for risk for both parts of type 1.5, glycotoxic: the inflammatory part and the atrophic part. For the inflammatory part, the best indicator is your hemoglobin A1c, since this is indicative of many proteins that are altered by high glucose, and thus may be inflammatory, as well as dysfunctional. Hemoglobin A1c is a reflection of your average serum glucose over the last 2-3 months.

TYPE
1.5

Your Results

Your hemoglobin A1c is 4.7%, which is excellent – congratulations! This indicates that you have low risk for this inflammatory part of type 1.5, glycotoxic Alzheimer's. This is very good news, since glycotoxicity is one of the most common contributors to cognitive decline.

Now for the second part – the atrophic part – of type 1.5, we need to evaluate insulin resistance. We usually think of insulin as being the hormone that lowers our blood sugar, but it also is an important support for the neurons in our brains. Therefore, resistance to the effects of insulin may compromise this support for our brain cells, and increase risk for cognitive decline. This is an important and common risk factor – over 100 million Americans have insulin resistance.

The best way to assess insulin resistance is to look at both fasting glucose and fasting insulin, since, when we become insulin resistant, we need to produce much higher levels of insulin to get our blood glucose back to a normal level (the insulin is no longer as effective). We use the fasting glucose and fasting insulin to calculate HOMA-IR, an accurate indicator of insulin resistance. The goal is for HOMA-IR less than 1.3, indicating good sensitivity to insulin.

Your HOMA-IR is 0.89, which indicates excellent sensitivity to insulin – congratulations! Your lack of insulin resistance indicates that you have no increased risk for this atrophic part of type 1.5 Alzheimer's, which is especially good news since insulin resistance is such a common risk factor for Alzheimer's disease.



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TYPE
2

TROPHIC LOSS

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Optimal

Nonoptimal

Reduction in hormonal, vitamin, nutrient, or growth factor support drives type 2 Alzheimer's disease.

Type 2, atrophic Alzheimer's, is associated with reduction (especially rapid reduction) in trophic support such as vitamin D, thyroid hormone, vitamin B12, estradiol, testosterone, insulin, and neurotrophins. Risk for type 2 is increased by ApoE4, early hysterectomy/oophorectomy (40 years of age or younger) without hormone replacement, low vitamin D levels, and in some cases menopause/andropause. It is important to rule out sleep apnea, as well, since optimal oxygen support for the brain is critical to avoid type 2 Alzheimer's.

Let's see how you are doing with risk for atrophic Alzheimer's, so that we can minimize this risk.

TYPE
2

Your Results

Vitamin D is one of the most important nutrients supporting brain function, and therefore low vitamin D is a risk for atrophic Alzheimer's. Vitamin D controls hundreds of genes, many of which are involved in brain cell connections and support.

Your vitamin D level was 56 ng/ml, which is excellent – congratulations! This level of vitamin D will not only help you to avoid cognitive decline, but also helps to avoid depression, cardiovascular disease, back pain, osteoporosis, and cancer, as well as supporting your immune function, and thus helping to prevent COVID-19 and other infectious diseases. Therefore, we recommend that, whatever vitamin D dose you are currently taking, you continue at the same dose. If you are not taking any vitamin D currently, then you may well be getting very good sunlight exposure, since that allows your body to make its own vitamin D.

TSH is thyroid-stimulating hormone, which is a good indicator of the function of our thyroid glands. Thyroid function is critical for brain health and cognition, and low thyroid is another contributor to type 2 (atrophic) Alzheimer's disease. Thyroid hormone is produced by our bodies by the addition of iodine to the amino acid tyrosine, and therefore, if we do not have enough iodine, we can suffer from reduced thyroid hormone. Another common cause of reduced thyroid is from attack on our thyroid by our own antibodies, which may occur in association with a leaky gut. This condition is called Hashimoto's thyroiditis, since it leads to inflammation of the thyroid, with associated poor function.

TSH is produced by the pituitary gland in our brain. TSH then travels via the bloodstream to the thyroid in our neck (near the trachea), and stimulates the thyroid to produce thyroid hormone. Therefore, if our thyroid is not producing enough hormone, then the TSH will go up, pushing the thyroid harder to make enough hormone. Let's see how you did on this blood test.

Your TSH (thyroid-stimulating hormone) is 2.6 uIU/ml, which is borderline high. This means that your thyroid is not working optimally, and therefore your pituitary gland is working overtime to make TSH to push your thyroid to make enough thyroid hormone. You may wish to talk with your practitioner about whether he or she feels that you should consider being treated, or whether he or she feels that it is not necessary to consider treatment at the current time. It is less important to talk with your practitioner about this if you have no symptoms of low thyroid, such as cold intolerance (many of us with low thyroid function prefer the room temperature 5 or even 10 degrees higher



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than others), loss of the lateral parts of our eyebrows, brittle hair, constipation, low body temperature, dry skin, weight gain, puffy face or hoarseness.

One of the best indicators of optimal thyroid level is the ratio of free T3—which is the active form of thyroid hormone—to reverse T3, which inhibits thyroid function. If the free T3 drops too low, or the reverse T3 rises too high, then thyroid function is likely to be too low. **Your ratio is 14.17**, which is lower than optimal. If you have any symptoms of low thyroid function, such as preferring the room to be warmer than others, loss of the lateral parts of our eyebrows, brittle hair, constipation, low body temperature, dry skin, weight gain, puffy face, or hoarseness, you may wish to talk with your practitioner.

Homocysteine is a toxic amino acid that, as noted above, may be increased in association with inflammation, but may also be increased as a result of poor nutrition, reduced vitamin B12, reduced folate, or poor methylation. Therefore, high homocysteine can also contribute to atrophic (type 2) Alzheimer's disease. High homocysteine is associated with risk for Alzheimer's, vascular damage, and brain shrinkage, whereas bringing homocysteine back to optimal levels is associated with protection against brain atrophy and cognitive decline.

Your homocysteine is 8.3 uM, which is still "within normal limits," but suboptimal for minimizing your risk for cognitive decline. This can easily be brought back to the optimal level of 7.0 or lower, simply by taking vitamin B6, B12, and folate. The most effective way to do this is to take vitamin B6 as P5P – pyridoxal 5-phosphate – which is the active form of vitamin B6, at a dose of 20–50 mg per day, along with vitamin B12 at 1 mg (half from methyl-B12 and half from adenosyl-B12 – note that in rare cases, B12 may cause anxiety, in which case you can simply switch to 1 mg of hydroxocobalamin), and methyl-folate at 2 mg per day.

This combination of P5P, B12, and folate brings the homocysteine back down to 7.0 or lower in the majority of people. However, if you find after a few months that your homocysteine is still greater than 7.0, you can add trimethylglycine at 500 mg twice or three times per day.



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TYPE
3

TOXICITY

Mar 1, 2023

Optimal

Nonoptimal

Some toxins are "dementogens" – in other words, they may cause dementia. Examples are some metals such as mercury, some organic chemicals, and some biotoxins such as mycotoxins (toxins produced by specific molds).

Type 3 is quite different from types 1, 1.5, and 2, and often presents with features other than (or in addition to) memory loss, such as depression, problems calculating, organizing, following instructions, or finding words. 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 increased by a poor detoxification system (e.g., due to reduced function of liver or kidneys or poor methylation or low glutathione level), constipation, air pollution, exposure to smoke, repeated exposure to fish with high mercury levels, toxins from specific molds (*Stachybotrys*, *Penicillium*, *Aspergillus*, *Chaetomium*, and *Wallemia*), pesticides, herbicides (such as weed killer), and other toxic exposures.

Type 3, toxic Alzheimer's, is the most complicated type, and unfortunately is also very common. Therefore, there is no single test for type 3 Alzheimer's risk, since we need to evaluate the chance of exposure to hundreds of different toxins. These fall into 3 general categories: metallotoxins (like mercury) and other inorganics (such as those from air pollution), organic toxins (like formaldehyde or toluene or glyphosate), and biotoxins (like trichothecenes or ochratoxin A). To get an idea of risk for type 3, we look at many different parameters, such as liver function (since many of the toxins affect the liver as well as the brain), kidney function, blood cells, direct measurements of toxins, and other parameters.

TYPE
3

Your Results

Based on your laboratory data and toxin-associated symptoms, your risk for toxin-associated cognitive decline is significant, and therefore it is likely that toxins may be contributing to cognitive changes. Please note that we are all exposed to toxins, and the ability to minimize exposure, while optimizing our detoxification, is what will minimize our risk for cognitive decline.

The ReCODE Protocol will provide detoxification that will help you to minimize your risk for toxin-associated cognitive decline, and the guides available on the Apollo Health website will provide more detailed information.

Given the results of the ReCODE evaluation, you should have a more extensive evaluation for the 3 major classes of dementogens. You can do this with your practitioner by evaluating your metal status with Quicksilver Tri-Test for mercury and Quicksilver all metals test (or a similar test from another group, such as Doctor's Data); GPL (Great Plains Laboratory) for organic toxins, including glyphosate; and mycotoxin tests from Great Plains or RealTime Laboratory. These additional tests provide direct quantification of the levels of the many toxins that may be contributing to risk for future cognitive decline. This will allow targeting of specific toxins, in addition to the overall detoxification provided by the ReCODE Protocol. Identifying and reducing these toxins offers the best chance for improvement in cognition.



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TYPE
4

VASCULATURE

Mar 1, 2023



Vascular damage and poor blood flow are important contributors to type 4 Alzheimer's disease.

We used to think of vascular disease as being unrelated to Alzheimer's disease, but over the past several years it has become clear that vascular abnormalities contribute importantly to Alzheimer's disease, and that optimizing vascular support to the brain plays an important role in achieving best cognition. In type 4, chronic vascular disease (which may be associated with high homocysteine or vascular amyloid or an abnormal lipid profile or breach of the blood-brain barrier, among other contributors) is associated with the development of Alzheimer's disease. Risk for type 4 (vascular) Alzheimer's disease is increased by high triglyceride levels, low HDL levels, inflammation that compromises blood vessels, sleep apnea, and poor diet, among other factors.

TYPE
4

Your Results

Therefore, let's take a look at your TG:HDL ratio, which is the ratio of triglycerides to high-density lipoproteins – in other words, a ratio of some key bad guys (TG) to some key good guys (HDL). This is an excellent predictive test, one that is far more important than simply looking at your total cholesterol. **Your TG:HDL ratio was 0.97**, which is excellent – congratulations! This means that your risk for vascular (type 4) Alzheimer's disease is low, and correspondingly the potential contribution of these vascular factors to cognitive change is not high.

Other markers of vascular risk, although not as predictive as TG:HDL ratio, include tests such as LDL (low-density lipoprotein), hs-CRP (a good test for inflammation, as noted for type 1 above), and homocysteine (also as noted for type 1 above). All of these predictors should come into the optimal range with your adoption of the ReCODE Protocol.

Your LDL was 105 mg/dl, which is borderline. Although your LDL is borderline, it is not the best indicator to measure vascular risk. To better evaluate your risk factor, we recommend testing your LDL particle number and consult with your practitioner. Your hs-CRP, as noted above, is 1 mg/l. Your homocysteine, also as noted above, is 8.3 uM. All of these parameters should reach or maintain optimal levels on the Protocol, thus helping to reverse your cognitive decline.



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TYPE
5

TRAUMA

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Head trauma due to concussions or other injuries is an important contributor to type 5 Alzheimer's disease.

When the brain is traumatized, for example due to an auto accident, the amyloid associated with Alzheimer's disease is produced as a response. Trauma is thus a risk factor for Alzheimer's disease. In many cases, the amyloid is removed, and thus chronic traumatic encephalopathy (CTE, which occurs in football players among others, and was featured in the film *Concussion*) typically lacks amyloid, but is related to Alzheimer's disease in featuring neurofibrillary tangles made of the tau protein. Risk for type 5 (traumatic) Alzheimer's disease is increased with sports-related head injuries (including repeated mild head injury, even without concussion), motor vehicle accidents, falls, whiplash head movements, and other forms of head trauma.

TYPE
5

Your Results

Your history suggests that your current risk for trauma-related cognitive decline is very low. You can keep it low by wearing a helmet if you are on a motorbike, avoiding contact sports and sports with repeated mild head trauma (such as repeatedly heading the ball in soccer), wearing your seat belt in the car, and avoiding whiplash injury.



WHERE DO I START?

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STEP

1**Resolve ongoing inflammation, and prevent new inflammation.**

Chronic inflammation is a critical contributor to Alzheimer's disease, and your genetic and biochemical profile is compatible with that finding. Preventing inflammation is important, but first the ongoing chronic inflammation must be resolved. Specialized pro-resolving mediators (SPM) are used for this purpose, followed by inhibitors of new inflammation, such as curcumin and specific anti-inflammatory nutrients. These are included in the synaptic support section of your program.

STEP

2**Enhance methylation to reduce homocysteine.**

Homocysteine is an important contributor to Alzheimer's disease and vascular inflammation, and reducing your homocysteine is one of the key goals of your program. This is accomplished with the synaptic support items listed in your program.

STEP

3**Optimize hormonal support for your brain.**

Your profile indicates that optimal hormonal support will be key for cognition, and therefore it is recommended that you consult your physician about the ideal hormonal support.

STEP

4**Achieve an ideal zinc level.**

Zinc deficiency is one of the most common health problems – about one billion people are zinc deficient worldwide – and is particularly common with type 3 (toxic) Alzheimer's. Zinc is an important contributor to several different processes related to cognition and metabolism, so achieving an optimal zinc level is important to optimize cognition. Zinc deficiency predisposes to copper toxicity, and contributes to glucose dysregulation and suboptimal immune responses, all of which may contribute to cognitive decline.

STEP

5**Minimize exposure to dementogens.**

There are many contributors to cognitive decline: just as we are exposed to many carcinogens (cancer-causing chemicals), we are also exposed to dementogens, such as specific toxic metals, organic solvents, pesticides, mycotoxins (toxins produced by mold species), and some medications, among others. Proton pump inhibitors (PPIs), often taken for reflux (GERD, or gastroesophageal reflux disorder), may reduce our absorption of critical nutrients for brain function, such as zinc and vitamin B12. Statins may reduce cholesterol, which is critical for brain structure, too far. Anesthetic agents, some antidepressants, some antihistamines, benzodiazepines, some pain killers (like opiates), and anticonvulsants (seizure drugs), are all drugs that affect cognition and can contribute to reduced cognitive ability.



UNDERSTANDING YOUR RESULTS YOUR RECODE JOURNEY

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Introducing the Bredesen 7

The best way to reverse cognitive decline is to combine the personalized aspects of your ReCODE Report, which has identified potential future drivers of cognitive decline, with the Bredesen Seven (or B7), the seven foundational strategies that work together to create neuroplasticity – the ability of the brain to establish, maintain, prune, and modify synaptic connections. Each of the strategies alone has the ability to promote neuroplasticity, but when practiced together they create powerful synergy. More extensive information on the B7 can be found in the guides to which you have access on apollohealthco.com.



Nutrition plays a remarkably important role in the reversal of cognitive decline. The goal is to utilize nutrition to support brain health by creating insulin sensitivity, increasing energy (via ketosis), reducing inflammation, improving vascular health, promoting autophagy, and more.



Exercise has many mechanisms by which it supports cognition. It increases your brain-derived-neurotrophic factor (BDNF) and increases cerebral blood flow and oxygenation. Additionally, it reduces overall stress, optimizes body mass index (BMI), improves insulin sensitivity, and optimizes overall brain and body physiology in numerous ways.



Sleep enhances our ability to focus, learn, and memorize. It is critical that oxygenation be appropriate during sleep (96–98% saturation is optimal) with the overall goal of 7–8 hours of quality restorative sleep each night.



Stress, especially chronic stress, can be a key contributor to cognitive decline. While stress is unavoidable, you can learn to control your reaction to it by adopting daily stress management practices. Additionally, consider including mindfulness – the ability to be fully present in a non-judgmental manner – to aid in the incorporation of the B7 strategies.



Brain Stimulation becomes even more important as we age to create neuroplasticity – the ability of the brain to establish, maintain, prune, and modify synaptic connections. This remodeling of our brains occurs throughout our lives in response to social and mental stimuli.



Detox is a multi-step process that involves avoiding “dementogens,” chemical agents that contribute to Alzheimer’s disease, as well as identifying and addressing current exposures while optimizing detoxification pathways to create resilience.



Supplements can support numerous mechanisms to optimize your biochemistry. While they are “supplemental” to the overall program, they can be an important contributor to healing, especially if you’re suffering from a specific nutritional deficiency that affects your cognitive health.



1. NUTRITION



Nutrients play a vital role in the prevention and reversal of cognitive decline. Poor nutrition activates multiple pathways that lead to cognitive decline; from inflammation, insulin resistance, poor immune response, suboptimal hormone and growth factor levels, to damaging lipid profiles and more. In contrast, optimal nutrition supports the brain through numerous mechanisms; from reducing inflammation, producing ketones used for energy, optimizing the response to insulin needed for brain support, providing critical support for the production and maintenance of brain connections (synapses), preventing damaging infections, reducing toxicity, and many other salutary effects.

The nutritional approach that has worked best to prevent cognitive decline is called KetoFLEX 12/3. This combines the various strategies that optimize the reversal of cognitive decline:

- **Keto** refers to ketosis, which occurs when your body breaks down fats to produce ketones for use as energy. These ketones support brain energy metabolism, which otherwise may be reduced for years leading up to Alzheimer's disease. The creation of ketones to be used as an alternative brain fuel prevents this neural shortfall and is therefore one of the most important goals in the reversal of cognitive decline.
- **FLEX** refers to two different concepts: one, it promotes **metabolic flexibility**, the ability to use either glucose or fat as a fuel source. Many of us have lost this ability from years of overconsuming a poor quality (refined, processed, and sugary foods) leading to insulin resistance, which in turn increases the risk for diseases such as dementia, cardiovascular disease, hypertension, and diabetes. Regaining this flexibility is a powerful step in the reversal of cognitive decline. Two, it also refers to the fact that the diet is **flexitarian**—heavily plant based with some animal protein, preferably wild-caught seafood and pastured eggs. Those who are vegans or vegetarians can also practice the diet by paying careful attention to some key nutrients for brain health.
- **12/3** refers to the minimum amount of time each day that you should spend fasting in order to optimize cognitive support. We recommend that your fast include the period of time that you are sleeping for a total of at least 12 hours (between the last meal of the day and the start of your first meal the next day) with at least 3 hours of the fast before bed.

The combination of the KetoFLEX 12/3 diet with fasting and exercise on a foundation of quality sleep generates ketones to create metabolic health for the long-term optimization of cognition and reversal of decline.

You can test your blood glucose (see our guide on tracking glucose: [STEP ONE: Tracking Glucose](#)) and ketones (see our guide on tracking ketone: [STEP TWO: Tracking ketones](#)) to track your progress.



How do I get started with KetoFLEX 12/3?

Just Say No

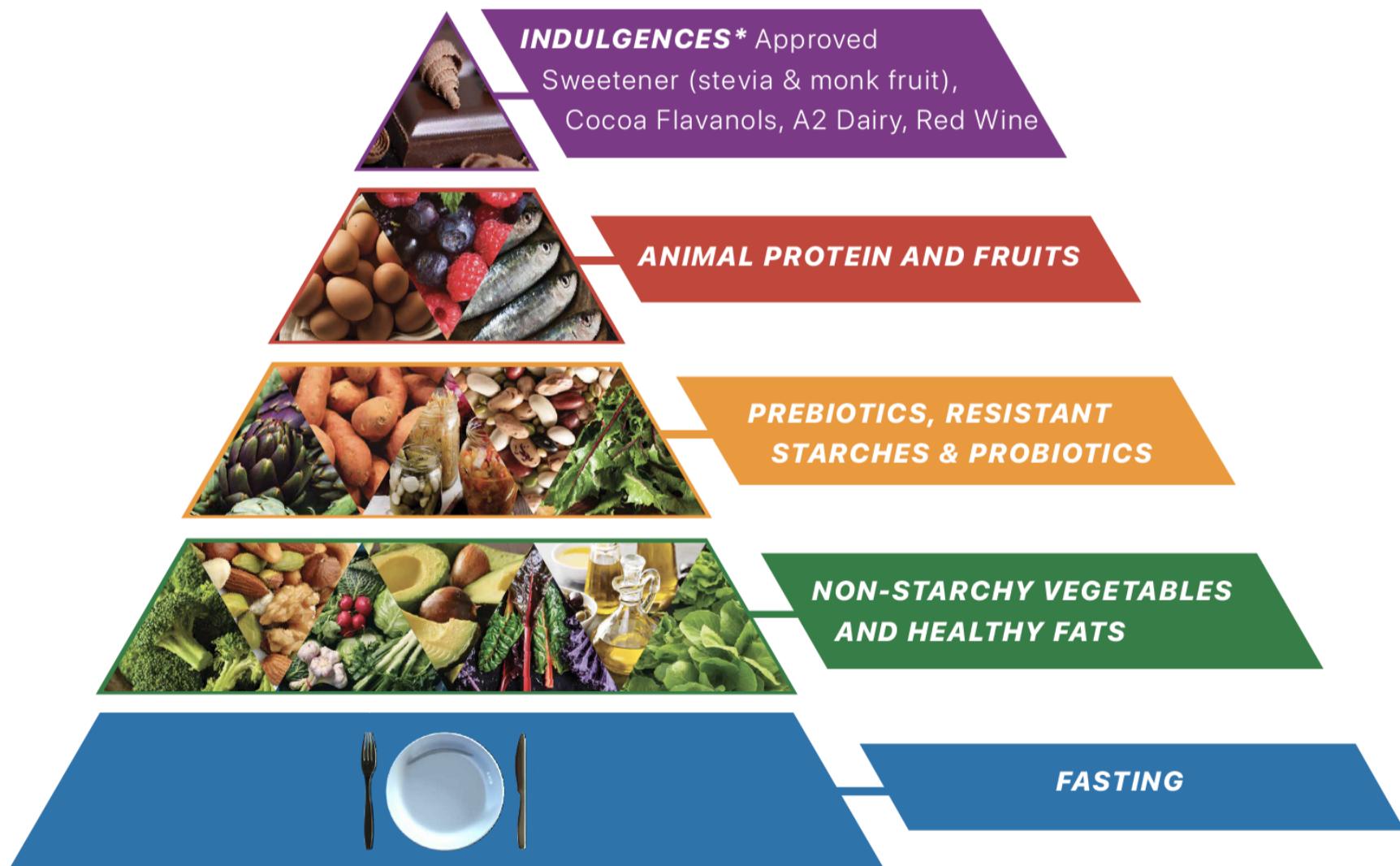
Eliminate all sugar, simple carbohydrates, conventional dairy and grains (with a few exceptions that are resistant starches).



What am I supposed to eat on KetoFLEX 12/3?

We offer the Brain Food Pyramid as a guide to improve your overall health and cognition. We encourage you to use the information to learn about how food affects you. Food is not only "medicine" but also a delicious opportunity to explore, experiment, and nurture! Simple adjustments in your food choices can provide profound healing. As with all food pyramids, we encourage you to partake generously from the bottom of the food pyramid and more sparingly as you move towards the top. We'll slowly move up the pyramid to discuss each level.

Brain Food Pyramid





YOUR SUGGESTED PLAN

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Brain Food Pyramid Level One

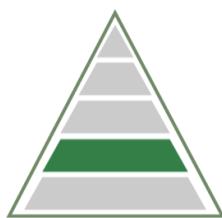
Fasting



- Fast for at least three hours before bed, for a minimum of twelve hours overall. As an example, if you finished supper at 7:30 PM, do not break your fast until at least 7:30 AM.
- ApoE4 carriers may want to try to extend their fast to 14-16+ hours.

Brain Food Pyramid Level Two

Non-starchy Vegetables & Healthy Fats



- Eat at LEAST 6-9 cups of deeply pigmented, organic, seasonal, local non-starchy vegetables per day, increasing the amount as tolerated.
- Challenge yourself to bring home one novel vegetable (or new variety of a familiar vegetable) each time you shop to expand your repertoire.
- Include leafy greens, especially those that are converted to nitric oxide.
- Include cruciferous vegetables, paying careful attention to preparation to maximize health benefits.
- Include fresh herbs, spices, and teas.



VEGETABLES

- Artichokes Pre
- Asparagus Pre
- Bamboo Shoots
- Beets (cooked) ☺ ☺
- Beets (raw) ☺ ☺
- Carrots (cooked)
- Carrots (raw)
- Celery ☺
- Celery root (Celeriac)
- Fennel
- Garlic Pre
- Heart of Palm
- Jicama Pre RS
- Leeks Pre
- Onions Pre
- Rhubarb ☺
- Sea Vegetables Pre
- Scallions Pre
- Shallots Pre
- Sunchokes Pre



LEAFY

- Arugula ☺
- Beet Greens ☺ ☺ ☺
- Cabbages ☺
- Bok Choy, Chinese, Napa, Savoy, Red & Green
- Chicory Pre
- Endive, Escarole, Frisée, Radicchio
- Collard Greens ☺ ☺
- Dandelion Greens ☺
- Lettuces ☺
- Leaf (red, green, oak), Butter (Boston & Bibb), Mesclun (young blend), Romaine (red,green)
- Kale ☺ ☺
- Mustard Greens ☺ ☺
- Purslane ☺
- Spinach ☺ ☺ ☺ ☺
- Swiss Chard ☺ ☺ ☺
- Turnip Greens ☺
- Watercress ☺



CRUCIFEROUS

- Arugula ☺
- Broccoli ☺
- Broccolini ☺
- Broccoli Sprouts ☺
- Brussels Sprouts ☺
- Cabbages ☺
- Bok Choy, Chinese, Napa, Savoy, Red & Green
- Cauliflower ☺
- Collard Greens ☺ ☺
- Dandelion Greens ☺
- Horseradish ☺
- Kale ☺ ☺
- Kohlrabi ☺
- Mustard Greens ☺ ☺
- Radish ☺
- Rapini (Broccoli Rabe) ☺
- Spinach ☺ ☺ ☺ ☺
- Swiss Chard ☺ ☺
- Turnip Greens ☺
- Watercress ☺



FRUITS, LEGUMES, FUNGI (Fruit: Seeded Vegetable)

- Acorn Squash ☺
- Avocado
- Capers
- Cucumber ☺
- Edamame ☺ ☺ ☺ ☺
- Eggplant ☺
- Green Beans ☺
- Mushrooms Pre
- Button, Chanterelle, Cremini, Oyster, Porcini, Portobello, Shiitake, Reishi
- Okra ☺
- Olives
- Peas ☺
- Green Peas, Snap Peas, Snow Peas
- Peppers ☺ ☺
- Pumpkin ☺
- Spaghetti Squash ☺
- Sprouts
- Alfalfa, Mung Bean
- Tomato ☺ ☺
- Tomatillo ☺
- Yellow Squash ☺
- Zucchini ☺ ☺



HERBS & SPICES

- Basil
- Bay Leaves
- Black Cumin
- Black Pepper
- Cinnamon
- Chives
- Cilantro
- Coriander
- Cumin
- Dill Seed/Weed
- Ginger
- Lavender
- Lemongrass
- Maca
- Marjoram
- Mint
- Oregano
- Parsley
- Rosemary
- Saffron
- Sage
- Tarragon
- Thyme
- Turmeric
- Vanilla
- Wasabi

Glycemic Index:

Green = Go	Must be USDA Organic
Yellow = Slow	Complete Protein
Red = Caution	Leafy
	Cruciferous

High Lectins High Oxalates
Pre Prebiotic RS Resistant Starch





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Brain Food Pyramid Level Two (continued)



- Increase healthy fat (with increased plant intake) to heal insulin resistance while creating ketones to fuel your brain.
- Prioritize high polyphenol Extra Virgin Olive Oil (EVOO), avocado, nuts, and seeds.
- Remember not to combine high glycemic and inflammatory foods with dietary fat.
- Be aware that as you heal, your need for dietary fat may decrease over time.

Tips For Buying Produce

The Environmental Working Group puts out an annual list of produce that's highest in pesticide residue called the "Dirty Dozen." Below see the KetoFLEX 12/3 approved options, including some that are otherwise GMO, which should always be USDA Organic or avoided. This is important because toxins such as pesticides, herbicides, and biotoxins are proving to be critical contributors to Alzheimer's disease, Lewy body disease, Parkinson's disease, and other neurodegenerative conditions.

Must Buy USDA Organic

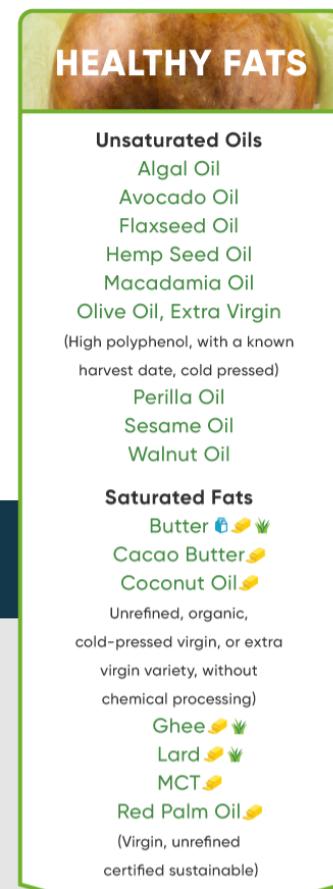
- | | | | | |
|-----------|------------|------------|----------------|----------------------|
| • Spinach | • Tomatoes | • Zucchini | • Beets | • Cherries |
| • Kale | • Celery | • Soy | • Strawberries | • Papaya (unripened) |

The Environmental Working Group also publishes a list of produce that's generally safe to buy non-organic called the "Clean Fifteen." Below see KetoFLEX 12/3 approved options.

OK to Purchase Non-USDA Organic

- | | | | | |
|--|------------|--------------------|---------------|-------------|
| • Avocados | • Onions | • Asparagus | • Cabbage | • Broccoli |
| • Sweet Peas (frozen only, small servings) | • Eggplant | • Kiwi (unripened) | • Cauliflower | • Mushrooms |

For KetoFLEX 12/3 approved produce that doesn't appear on either list, it's generally safest to purchase USDA Organic , from the US or other countries with similar or higher standards, if you can find and afford it.



Glycemic Index:
Green = Go
Yellow = Slow
Red = Caution

Inflammatory Dairy
 High Saturated Fatty Acids
 100% Pastured



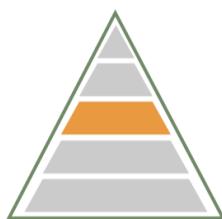
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Brain Food Pyramid Level Three



Prebiotics, Resistant Starch & Probiotics



- If you have any chronic GI issues: work to address root causes, incorporate strategies to optimize digestion, and consider a 3-week elimination diet to identify hidden food sensitivities.
- Slowly incorporate foods with prebiotic fiber into each meal.
- If resistant starch is appropriate for you, look for opportunities to add small amounts into your diet using healthy fats to reduce the glycemic effect if necessary.
- Once insulin sensitivity and gut health have been remediated, a long-term goal is the incorporation of more resistant starches.
- Experiment with adding a variety of probiotic foods into your diet.





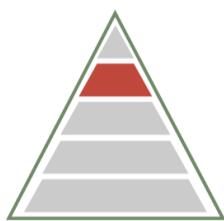
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Brain Food Pyramid Level Four



Animal Protein & Fruit



- Healthy people should limit protein consumption to 0.8-1.0 gram per kilogram of lean body mass per day with some exceptions outlined in [The KetoFLEX 12/3 Nutrition Guidelines Chapter 6](#).
- Be aware that protein goals may be reduced as healing progresses to enhance autophagy, the body's way of cleaning damaged cells.
- All plants contain some protein. There is no need to limit your protein from whole plants.
- Prioritize wild-caught seafood and pastured eggs.



Salmon
 Mackerel
(avoid king mackerel)
 Anchovies
 Sardines
 Herring
 Cod
 Pollak
 Sole
(flounder)
 Shrimp
 Scallops
 Clams
 Crab
 Mussels
 Oysters
 Eggs
 Bone Broth
 Liver
(and other organ meats)
 Bison
 Lamb
 Beef
 Pork
 Chicken
 Duck
 Goose
 Turkey



Apricot
 Bilberries
 Blackberries
 Blackcurrants
 Blueberries
 Boysenberries
 Cherries
(tart)
 Coconut
 Crabapple
(wild, in season)
 Cranberries Pre
 Grapefruit
 Green Banana Pre RS
 Green Plantain RS
 Green Mango RS
 Green Papaya RS
 Kiwi
(unripe)
 Lemon
 Lime
 Mulberries
 Pear
 Persimmon Pre RS
 Pomegranate Pre
 Raspberries Ox
 Strawberries



For Vegetarians and Vegans

KetoFLEX 12/3 is flexitarian, heavily plant-based with some animal protein. Those who choose to avoid all (or most) animal foods should pay careful attention to key nutrients for brain health. See the guide [KetoFLEX 12/3 for Vegans and Vegetarians](#) to learn more.

- Eat heirloom fruit seasonally. Depending upon what part of the world you live in, there may be many other options available. Always balance nutritive value against glycemic concerns.
- Enjoy small portions (1/2 cup or less) of wild berries year round.
- Unripened tropical fruit (green plantains, bananas, mangoes, papayas, and kiwi) may be eaten in small amounts as resistant starch and for their natural digestive enzymes.
- Lemons and limes are great sources of vitamin C and can be enjoyed liberally.

Glycemic Index:
 Green = Go
 Yellow = Slow
 Red = Caution

Must be USDA Organic
 High Saturated Fatty Acids
 Wild-Caught
 100% Pastured

Pre Prebiotic
 RS Resistant Starch
 High Oxalates

See **Level Four** for protein recommendations and sourcing instructions.



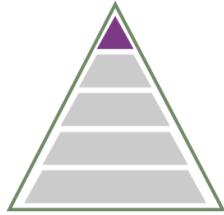
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Brain Food Pyramid Level Five



Approved Sweeteners, Cocoa Flavanols, A2 Dairy & Red Wine



- If necessary, use limited amounts of approved sweeteners— pure forms of stevia and monk fruit. Additionally, those who are insulin sensitive may consider limited amounts of honey.
- To derive the health benefits of flavanols, enjoy small amounts of high cacao chocolate, low in sugar, cadmium and lead. Safe examples include: Montezuma's Dark Chocolate Absolute Black 100 Cocoa, Ghirardelli Intense Dark 86% Cacao Midnight Reverie, Endangered Species Dark Chocolate 88% Cacao and Sam's Choice Swiss Dark Chocolate 90 Cocoa.
- Because of toxicity concerns, limit cacao nibs and avoid cocoa and cacao powder.
- Consider a flavanol supplement.
- Avoid all conventional dairy.
- You may have small amounts of A2 dairy, and A2 dairy products, if tolerated and desired.
- Alcohol is a neurotoxin and best avoided by anyone at risk of or suffering with cognitive decline.
- If you decide to indulge occasionally, consider small amounts of organic sugar-free, low alcohol red wine.

For those interested in the full details of the KetoFLEX 12/3 diet, please read through our complete [Nutrition Guidelines](#).



You may also want to consider:

You may want to consider speaking with your practitioner regarding:

- Repeat homocysteine in 3 months, and if still higher than 7, add trimethylglycine 500mg.
- Obtain Cyrex Arrays 2, 3, 20.

2. EXERCISE



Exercise has multiple mechanisms by which it promotes overall health and cognition. Regular, significant exercise –combining aerobic and strength training—is one of the most important tools in the remediation of cognitive decline.

General Health Benefits of Regular Exercise

- Maintains a healthy body mass index (BMI)
- Improves insulin sensitivity
- Reduces insulin resistance
- Decreases systemic inflammation
- Improves blood pressure
- Reduces the risk for heart disease and stroke
- Increases blood oxygenation
- Generates ketones for fuel
- Increases mitochondria— the "batteries" of our cells
- Decreases stress and anxiety
- Enhances mood and sleep

Scientific Review of How Exercise Impacts Cognition

Regular exercise has been shown to not only improve many aspects of cognition, but also to change brain imaging. Those who exercise have greater brain volume (particularly hippocampal volume), enhanced brain function (particularly in the frontal lobe), increased cortical thickness, and reduced white matter lesions. Everyone wants to know the best form of exercise for brain health. Research is mixed, with aerobic exercise taking a slight lead over strengthening exercise, but both are vitally important especially as we age. The two different types of exercise activate different mechanisms, thus protecting against cognitive decline by different routes.



Scientific Review of How Exercise Impacts Cognition (continued)



Aerobic Exercise

- Increases blood flow throughout the body and in the brain
- Upregulates brain derived neurotrophic factor (BDNF) "fertilizer" for the brain
- Activates the glymphatic system that helps to clear amyloid-beta and other toxins
- Reduces levels of tau in the brain

Strength Training

- Prevents sarcopenia— the loss of muscle
- Prevents osteopenia— the loss of bone
- Improves balance
- Enhances the ability to perform activities of daily living

How to Get Started

- 1 Increase movement throughout the day. Avoid sitting for extended periods. Look for opportunities to be active. Perform household chores with vigor. Always take the stairs in lieu of an elevator or escalator. Walk to your destination when possible. If you must drive, try to park as far away from your intended stop as possible to increase your overall activity level.
- 2 Take a daily walk, preferably outdoors. Research shows that spending time in nature confers healing properties. Work up to at least 30 minutes per day. Walk with a purpose with the intention of increasing your heart rate to derive optimal benefit. It's a good idea to vary your speed throughout your walk, with periods of running if you are able.
- 3 Adopt a strength training program 3-4 times per week. If you've never engaged in strength training before, consider working with a personal trainer to develop a personalized program for overall body strength, with a special emphasis on building leg strength.
- 4 Consider adding a few mind-body exercise classes (or solo practice once proficient) per week, such as yoga, tai chi, or ballroom dancing.

Strong Legs = Strong Brain

When developing a strength training routine, don't forget your legs. Multiple studies have found that leg strength is correlated with cognitive health. Squats are a simple leg strengthening exercise that use your own body weight. If your legs are weak, start in front of a chair so that you can sit down if necessary. Work up to 3 sets of squats with 10-15 repetitions, 3-4 days per week.





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Start Slow and Grow



Evaluate your starting point. You may be easily able to apply these recommendations and more. If so, keep up the great work! If you're currently not physically active or have specific limitations, start slow and challenge yourself to do a little more each day.



How to Determine Maximum Heart Rate

Subtract your age from 220. For instance, if you're 60, subtract 60 from 220 to get a maximum heart rate of 160. This is the maximum number of times your heart should beat per minute during exercise.

Exercise: Just Do It

Exercise is one of the best ways to protect cognition and is also an important part of the protocol to reverse cognitive decline. Read our detailed guide [EXERCISE: "Just Do It"](#) for more, including recommendations for which types of exercise address specific Alzheimer's sub-types. For example, have you heard about EWOT? This is exercise with oxygen therapy and is recommended for anyone with vascular compromise or poor oxygenation. The guide also provides strategies for keeping your daily walk fresh, ideas for cross-training, specific types of exercises for those with limitations, and much more. Baby steps turn into exhilarating hikes through nature. The more active you become, the better you'll feel, and the more you'll want to exercise.

3. SLEEP



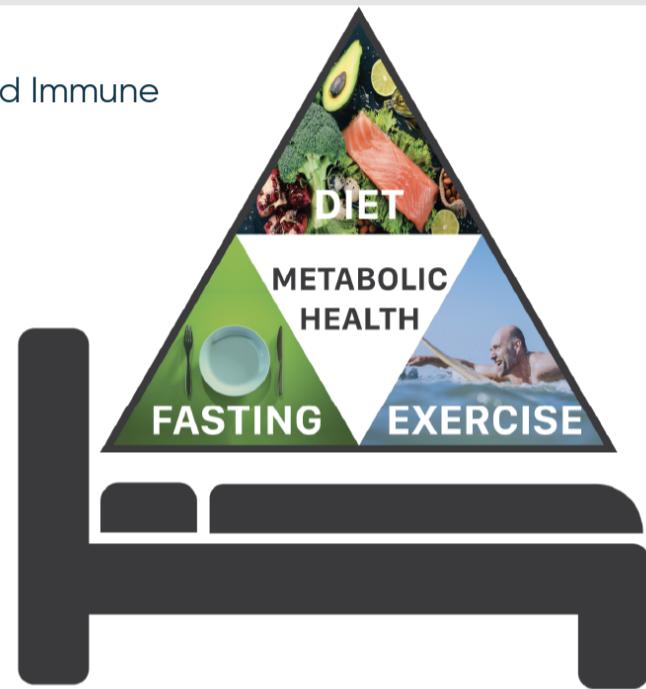
You know that phenomenal feeling you experience after awakening from a good night's sleep – the sense that you're ready to take on whatever the day has to offer? It's no surprise that restorative sleep is emerging as one of the most important strategies for the prevention and reversal of cognitive decline. Sleep enhances our ability to focus, learn, memorize, and make logical decisions. It is critical for everyone at all stages of life. In fact, a growing body of scientific evidence demonstrates that too little sleep can be harmful to your overall health.

Risks From Chronic Sleep Deprivation

- Obesity
- Diabetes
- Heart Disease
- Increased Inflammation
- Weakened Immune System

All of these conditions are bidirectional and also affect brain health. In fact, sleep is so important, that we made it the bedrock of the KetoFLEX 12/3 lifestyle.

Indeed, it would be very difficult to execute the protocol—to promote metabolic health by fasting, exercising or implementing our nutritional recommendations—without a foundation of restorative sleep.



What Happens in Our Brains When We Sleep?

Sleep is vital for memory consolidation. The enormous amount of information we encounter throughout the course of a day must be processed and stored before it is directly logged and recorded into our brains. Many parts of this intricate process occur while we sleep. Information is reviewed, some discarded, others integrated and eventually transferred from our more tentative short-term memory to our more secure long-term memory. Adequate sleep is vital, not only for focus, attention, learning, and decision-making, but most importantly, for memory formation.

Exciting new research is revealing that the glymphatic system – comprised of glial cells that act as a waste disposal system for the brain – plays an important role in clearing toxins. In fact, new evidence demonstrates that our glymphatic system functions most effectively, increasing clearance by ten to twenty-fold, during deep sleep.



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Your Sleep Goals

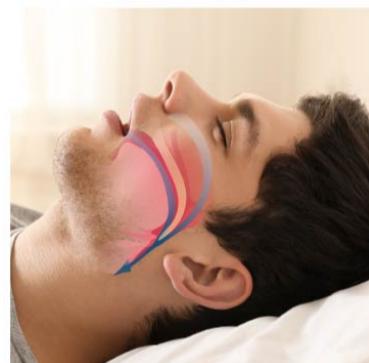


- 1 Try to get 7-8 hours of quality sleep every night, ideally winding down when the sun sets and awakening with the sunrise. If your work prevents this schedule, do your best to still achieve 7-8 hours of restorative sleep by totally darkening the room or by using a sleep mask.
- 2 If you are currently using a prescription sleep aid, work with your healthcare practitioner to wean off. The vast majority of sleep medications have negative long-term consequences for neurological health. Instead, adopt a sleep hygiene program and consider supplements that will support and protect your brain health.
- 3 Rule out obstructive sleep apnea. Periodically check your nighttime oxygen saturation to ensure that your brain is receiving adequate oxygenation while you sleep.



Ensure that Your Brain is Receiving Adequate Oxygen

Obstructive sleep apnea – and indeed anything that reduces oxygen saturation while sleeping – is emerging as an important risk factor for Alzheimer's disease. This common type of sleep apnea is caused by complete or partial obstruction of the upper airway and may or may not associated with snoring. Even thin people with certain facial structures like narrow facial bones, high arched palate, or a chin that is not prominent may have their tongue pushed back to obstruct the airway. Those who suffer, experience repetitive episodes of shallow or paused breathing during sleep. This is typically associated with a reduction in blood oxygen saturation that can lead to cognitive decline. It's very important to quantify your oxygen saturation during sleep. See [GROUND ZERO: Is My Brain Getting Enough Oxygen?](#) for detailed instructions.



Normal airway



Obstructive sleep apnea

Sweet Dreams are Made of This

Regular restorative sleep for healthy cognition is within your grasp. We've put together a comprehensive guide that outlines a multitude of strategies to help you create a sleep hygiene program to optimize your sleep. The guide also helps you identify harmful sleep medications and provides a comprehensive list of neuroprotective supplements plus much more. See [SLEEP-The Antidote](#) for details.

4. STRESS



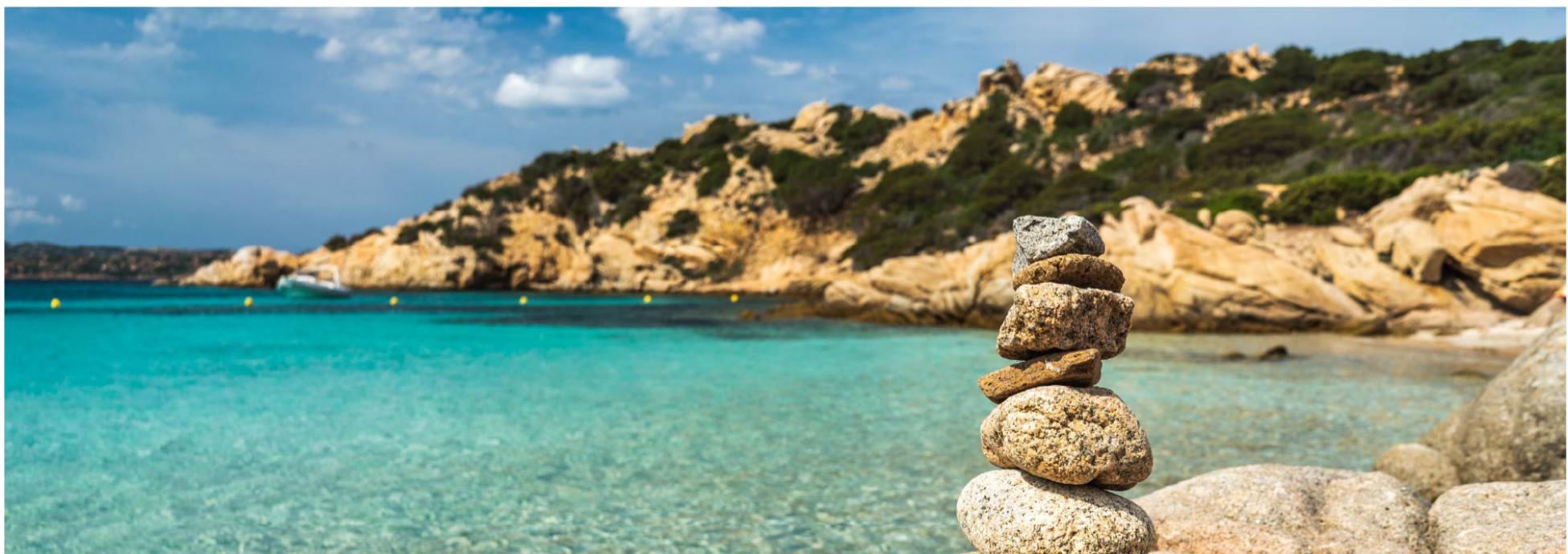
Stress, especially that which is chronic, unresolved or severe, can be a key contributor to cognitive decline. We all know that stress is an inevitable part of life. In the short term, it can even be a positive response—protecting us from harm-giving us the energy to run from a mountain lion or rescue someone in need. Stress only becomes harmful when it's chronic, unresolved and severe. It's important to understand that stress exerts very real physiological effects on our bodies.

What Happens To My Body Under Stress?

When we sense impending danger, neurotransmitters send information to the amygdala, a part of the brain that processes emotional signals, and a danger alarm is sent to the hypothalamus. The hypothalamus then acts like a switchboard, communicating with the rest of the body through the nervous system activating the "fight or flight" response. From there, hundreds of involuntary bodily functions are triggered: adrenalin floods our body, increasing our heart rate, and contributing needed blood flow to our muscles and vital organs. We breathe more rapidly, causing small airways in the lungs open to flood our brain with oxygen. Our blood vessels are dilated, our blood pressure rises, and our senses are heightened. Glucose is released, supplying energy to all parts of the body giving us the energy we need to respond to the perceived threat.

When stress is chronic, unresolved or severe, it can contribute to hypertension, heart disease, obesity, sleep disorders, and even cause brain changes that can contribute to cognitive decline.

It's helpful to understand that our early experiences can play a part in how we handle stress. Those of us who had traumatic experiences as children often misperceive benign situations as threatening leading to a chronic state of stress. **The good news is that we can break this cycle and learn to control our response to stress.**





YOUR SUGGESTED PLAN

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How to Get Started



- 1 Adopt a daily stress management practice that could include mindfulness, meditation, Neural Agility, the Dynamic Neural Retraining System, HeartMath, prayer, tai chi, qigong, or yoga. Learn about each strategy in [STRESS: Just Breathe](#) and experiment to find what combination works best for you.
- 2 Build daily stress management habits into your daily schedule.
 - Give yourself permission for self-care
 - Don't over-schedule
 - Use lists
 - Unplug from technology
 - Avoid multi-tasking
 - Exercise, especially outdoors
 - Get 7-8 hours of quality sleep

Square Breathing

Try this mindfulness breathing exercise to address immediate feelings of stress called **square breathing**.

- 1 Pay attention to your breathing pattern. Note if it is fast or slow. Don't judge or label it as "good" or "bad." Simply observe it.
- 2 Luxuriate in the awareness of the rise and fall of your chest. Consciously focus upon the rush of oxygen that fills every part of your body. Fully relax with the expelling of each breath.
- 3 As you breathe, other thoughts will come up, as they always do. No need to push them away. Simply notice them without judgement and then return gently to the breath.
- 4 When you feel ready, imagine drawing a box with your breath. You begin by consciously holding your breath for four seconds; breathing out for four seconds; waiting for four seconds; and inhaling for four seconds. All the while, you are imagining a square. Each part of the exercise draws one side of the square.

5. BRAIN STIMULATION



Our brains continue to grow new neurons throughout our lives – even in old age – in response to social and mental stimuli, as well as healing from trauma or injury through a process called "neuroplasticity." We all know that when we exercise, our muscles grow stronger. If we stop, our muscles deteriorate. Even though the brain is not a muscle, the same principle applies. Challenging our brains provides the opportunity for growth. Our daily thoughts, habits, movements, etc., can shape and rewire our brains. If we lead socially isolated, unstimulated lives, our brains will atrophy over time. Conversely, leading socially enriched, stimulating lives can protect our brains.



Tips To Stimulate Your Brain

- 1 Stay socially active.** It's especially important to build and maintain a strong support system. Research shows that those with strong social connections are 46% less likely to develop dementia.
- 2 Identify and nurture your purpose.** Research shows that having a sense of purpose is a strong determinant of both overall health and mortality. Older adults who nurture their "passions" score much higher on cognitive testing than their less purposeful counterparts.
- 3 Engage in lifelong learning.** Those with more education are less likely to develop dementia. Everyone can benefit from this, regardless of your level of formal education. Challenge yourself to continue learning in ways that are pleasurable. Take a class focused on a topic that fascinates you, learn a foreign language or musical instrument, or simply challenge yourself to crosswords or sudoku puzzles.
- 4 Listen to music.** Turn off the TV and listen to music instead. Research shows that music stimulates deep neural connections and can positively affect gene expression to optimize hormone levels.
- 5 Challenge yourself with daily brain training.** Research shows that brain training can help to create neuroplasticity. We recommend BrainHQ because of the strong science supporting its efficacy. Try to practice 90 minutes each week. Each exercise is broken up into two-minute bites so that you can easily squeeze it into your daily schedule. Don't get too competitive with yourself. Keep it challenging, yet fun.
- 6 See [BRAIN STIMULATION: Upsizing](#)** for more detailed information.



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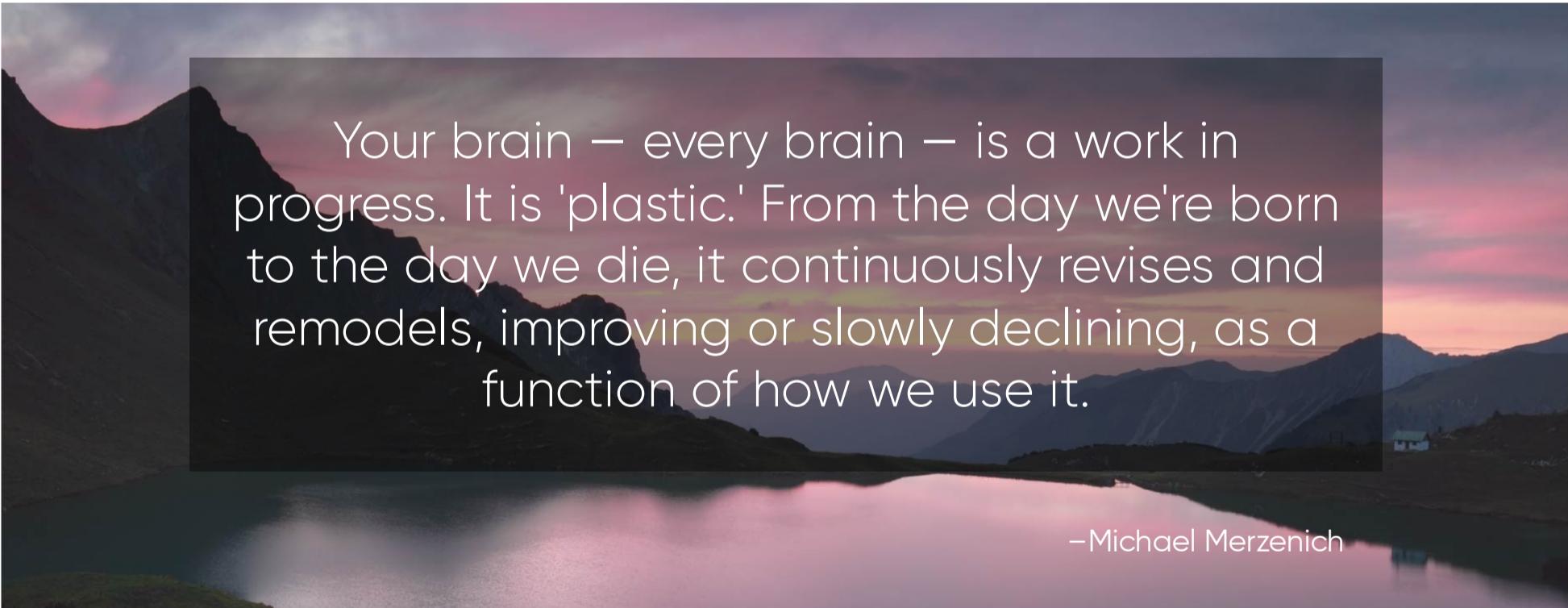
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Upsize Your Brain



- Take a class focused on whatever subject excites you.
- Learn a foreign language or practice one you already know.
- Play (or learn to play) a musical instrument.
- Discover ballroom dancing and practice with a partner.
- Do puzzles to challenge your brain, like crosswords and sudoku.

It's important to stay mentally active, to "upsizing" our brains as we age. Our brains continue to grow new neurons throughout our lives in response to social and mental stimuli, as well as healing from trauma or injury. You can harness this by staying socially active, building a support system, having a strong purpose in life, and engaging in lifelong learning opportunities. Additionally, even simple pleasures like listening to music and dancing can help create new neural pathways. Consider daily brain training to keep your brain challenged. Use [BrainHQ](#) or any similar program such as Lumosity, Elevate, or Peak. Keep it fun and challenging with sessions lasting no more than 20-30 minutes. See [BRAIN STIMULATION: Upsizing](#) to learn more.



Your brain – every brain – is a work in progress. It is 'plastic.' From the day we're born to the day we die, it continuously revises and remodels, improving or slowly declining, as a function of how we use it.

–Michael Merzenich

6. DETOX



We've all heard of the term carcinogens; these are chemical agents known to cause cancer. Our food, personal care products, medical treatments, household and workplace exposures are evaluated for carcinogenic potential. We coined the term "dementogens" to refer to chemical agents that contribute to Alzheimer's disease. Like carcinogens, dementogens are so ubiquitous, it's not an exaggeration to say that they are everywhere, and we are being exposed daily without even being aware. Avoidance of "dementogens" is a vital part of both preventing and reversing cognitive decline.

How To Get Started

- 1 Ensure that the air you breathe, the water you drink, the food you eat and the products and chemicals that you're exposed to in both your home and work environment are as toxin-free as possible. See [DETOX: Beware of Dementogens](#) for details on how to create a toxin-free environment.
- 2 Pay particular attention to mold in your home or workplace, as we've found a close association, especially in those who are genetically vulnerable, with cognitive decline. See [What is ERMI?](#) to learn how to test for mold. Also be aware that the symptoms associated with mold exposure are often very similar to those found with Lyme disease and Lyme co-infections. Chronic (often undiagnosed) Lyme disease and/or Lyme co-infections can compromise the immune system making you even more vulnerable to the effects of mold illness. Identifying and addressing both may be vital for the long-term protection of cognition.
- 3 Practice good hygiene to minimize inflammation thereby maintaining internal intact barriers (gut lining, blood-brain barrier, oral, nasal) as well as external (skin, nails, hair). Always use non-toxic products and soap (like Castile) and try to work up to several minutes of cold water at the end of your shower to upregulate your immune system and mitochondrial energetics. If needed, follow up with an all-natural moisturizer, like pure shea butter, coconut or olive oil. Research shows that keeping skin moisturized reduces systemic inflammation.
- 4 Oral hygiene is especially important as oral microbes have been repeatedly identified in the brains of those with Alzheimer's disease. Be aware that mercury amalgams, cold sores, root canals and gum disease could be contributing to your risk for Alzheimer's. See [Oral Health for Brain Health](#) to learn more.





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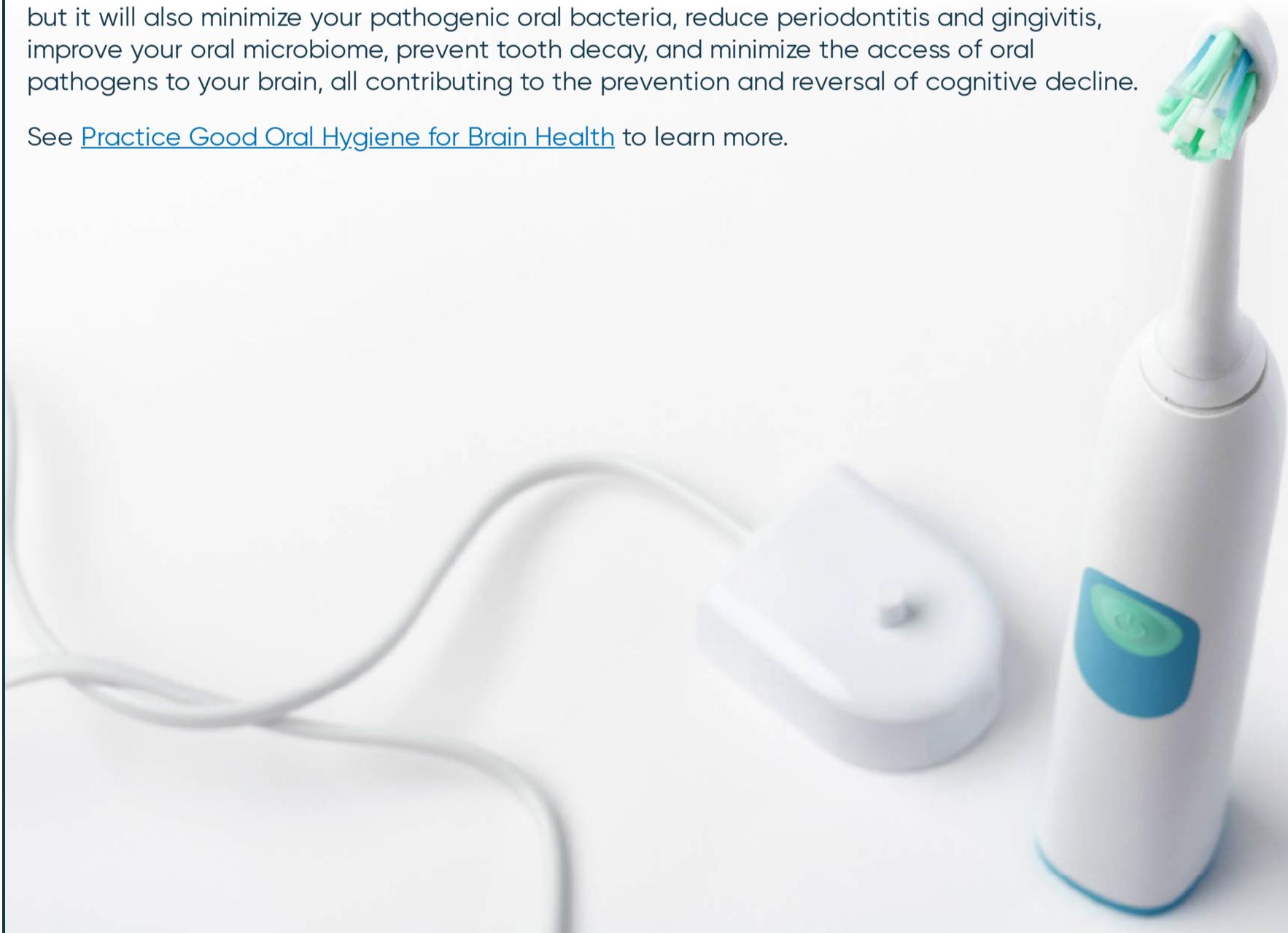
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Tips for Oral Hygiene

- Brush your teeth in the morning and brush and floss after each meal. Always brush gently with the same pressure you would apply, so as not to bruise a ripe peach. The outer layer of tooth enamel can be worn away with too vigorous brushing, leaving you more vulnerable to gum disease.
- Consider a water flosser and an electric toothbrush (with attention to the sanitation of that equipment) to improve overall oral health.
- Avoid toothpaste, mouthwash, and water that contains fluoride, which is a potent neurotoxin.
- Consider adding oil pulling to your oral hygiene regimen. This ancient Ayurvedic practice has been shown to reduce the bacteria associated with tooth decay. You simply swish oil (coconut is preferred because of antimicrobial properties but some use ghee, sesame or olive oil) between your teeth for 5-10 minutes each morning.
- Instead of having your teeth professionally cleaned twice a year, consider increasing your visits to three times a year. Stepping up this routine maintenance will help to keep your teeth cleaner and will also alert your dental professional to any emerging problems.
- Consider a probiotic for oral health such as *Streptococcus salivarius*, which helps to reduce pathogenic bacteria. Your oral microbiome, which is the first part of the GI tract, can benefit from optimization.

Regularly following these strategies will not only improve the look of your teeth and gums, but it will also minimize your pathogenic oral bacteria, reduce periodontitis and gingivitis, improve your oral microbiome, prevent tooth decay, and minimize the access of oral pathogens to your brain, all contributing to the prevention and reversal of cognitive decline.

See [Practice Good Oral Hygiene for Brain Health](#) to learn more.



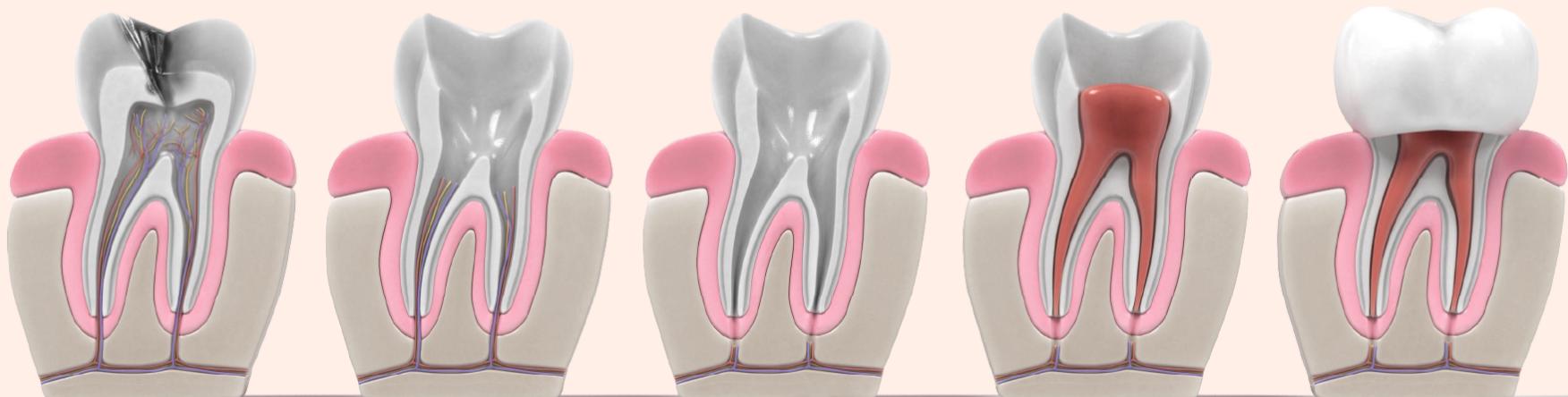
 Root Canals

This is a procedure typically done by an endodontist or general dentist to save a tooth when the inside of the tooth (pulp) becomes infected due to deep decay. The association between root canals and cognitive decline is emerging and controversial. Some speculate that chronic post-procedure infections can directly contribute to neurological toxicity and cognitive decline through type 3 (toxic) contributors, cardiovascular disease, and type 4 (vascular) contributors. There is anecdotal evidence that some root canal patients do develop symptoms of cognitive decline following root canal procedures. Other health conditions that have been linked to dental infections include:

- Heart attacks and strokes
- Diabetes and hypertension
- Autoimmune disorders
- Osteoarthritis and rheumatoid arthritis
- Diabetes and hypertension
- Fibromyalgia and other pain disorders
- Cancer (pancreatic, esophageal, colon, others)
- Pregnancy complications including preterm labor and stillbirth.

Action Plan

If you have had root canals and have any cognitive decline or cardiovascular disease, we suggest you see a dentist well versed in the effects of oral infections on systemic disease. They may suggest a special X-ray called CBCT that can identify these trapped infections. Extraction and implant may be necessary.





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Periodontitis



Bleeding gums, receding gums, bad breath, and gum sensitivity may reflect underlying gingivitis or periodontitis.

Gingivitis and periodontitis are terms for gum inflammation caused by infection from high risk oral bacteria including *Porphyromonas gingivalis* (*P. gingivalis*), *Treponema denticola*, *Fusobacterium nucleatum*, and *Prevotella intermedia*, and others. These pathogenic "bad bugs" can work their way into the bloodstream and be spread throughout the body. Wherever they land, they can elicit inflammation and disease as they do in the mouth. This includes the brain.

Several of these toxic organisms have been found in the brains of those with Alzheimer's Disease suggesting type 3 (toxic) contributors, and the arteries that supply the brain indicating type 4 (vascular) contributors. Other diseases shown to be impacted by these bad bugs include:

- Heart attacks and strokes
- Diabetes and hypertension
- Autoimmune diseases
- Rheumatoid and osteoarthritis
- Fibromyalgia and other pain disorders
- Some cancers (pancreatic, esophageal, colon, others)
- Pregnancy complications (preterm labor and stillbirths)

A healthy mix of bacteria (microbiome) leads to healthy teeth and gums and a lower risk of these systemic diseases.

Action Plan

- 1 Work with a complete health dentist, well-versed in the oral-systemic disease links. They should include an assessment called *periocharting* in their evaluation. This is where they measure the depth of the pockets between your teeth and gum and look for bleeding when they probe.
- 2 Do not tolerate any blood in the sink! Any blood in the sink when you brush, floss, or pick indicates inflammation, and inflammation reflects infection with these microorganisms.
- 3 Talk to your dentist or physician about collecting a test that measures these pathogenic bacteria (*P. gingivalis* et al.). This will tell you whether you have high levels of these dangerous bacteria in your oral microbiome. Be aware that most dentists and physicians are not familiar with the availability of these tests.
- 4 If you have gum bleeding or find high levels of the pathogenic bacteria, talk to your dental team about a strategy to correct your microbiome. This may include office procedures, Dentalcidin toothpaste and mouthwash, using a sonic toothbrush, 100% xylitol, oral probiotics, antiseptic mouth rinses, hydrogen peroxide gel trays, and other home care recommendations. Be sure to use antiseptic mouth rinses and hydrogen peroxide gel trays only as recommended by your dental professional (preferably for short periods, unless otherwise directed by your dental practitioner) as they can also kill good bacteria in your mouth.
- 5 Create a healthy oral environment. Acidic fluids and dry mouth fuel the growth of the pathogenic bad bugs. Soda, many foods, and even some brands of bottled water can create an acidic environment in your mouth. Rinse your mouth with water after every meal and especially before bedtime to neutralize the acidity. If you have dry mouth, talk to your doctor about medication you take that can cause dry mouth and ask whether adjustments can be made. Another important cause of dry mouth is sleep apnea. See [GROUND ZERO: Is My Brain Getting Enough Oxygen?](#) to learn how to diagnose and treat.

Build Resiliency By Optimizing Detoxification



To protect yourself against an increasingly toxic environment, it's important to build resiliency by optimizing your body's ability to detoxify. For details on optimizing detoxification, see [DETOX: Beware of Dementogens](#).

How to Optimize Detoxification

- Drink clean filtered water, 1 to 4 liters per day.
- Eat fiber, both soluble and insoluble, preferably in the form of cruciferous vegetables. The goal is greater than 30 grams of fiber each day.
- Sweat through exercise or sauna, then wash with non-toxic soap such as Castile.
- Spend time outdoors, especially if you suspect your house or office has mold. Also, consider a HEPA filter to improve household air quality.
- Optimize your gut. See details in [Chapter 5](#) of the nutrition guidelines.
- Ensure that your own endogenous detoxicants, such as glutathione, are optimized with supplements.
- Support your liver with supplements and diet.
- Support your kidneys with supplements and diet.
- Stimulate your lymphatic system through rebounding, lymphatic massage and dry brushing.
- Manage stress.





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7. SUPPLEMENTS



Each part of the "B7" is designed to improve the neurochemistry that supports the production, maintenance, and optimal function of synapses, the critical connections in our brains. If we optimize the various parameters in the B7, we should be able to make and maintain these synapses for decades to come. As you've already read, diet, exercise, sleep, stress management, brain stimulation, and detoxification are all important and powerful. Adding to these is supplementation, and while the effective use of supplements is critical for best outcomes, please remember these are, by definition, supplementary. Thus they are meant to be used with the other members of the B7, and in such a setting, they provide effective synaptic support.

In order to keep pill and capsule numbers to a minimum, we have worked with LifeSeasons to synthesize a supplement solution for you. We suggest individuals on the protocol to include the ReCODE Core Kit in their supplement regimen. The ReCODE Core Kit includes a Morning Balance, Evening Balance, Daily Multivitamin, Daily Probiotics, Daily OMEGA-3, and Daily Antioxidants. In addition, depending on your subtyping, we recommend additional subtype formulas in your personalized protocol (below).

If you are currently taking medications such as blood thinners, please consult with your physician before starting supplements.

ReCODE Core Kit

ReCODE Morning Balance

Suggested Use: In the morning, mix two level scoops with water and drink.

ReCODE Morning Balance contains ingredients that have been shown to promote cognition and memory by providing signaling and trophic support. Exogenous ketones are included to fuel energy production and endurance. Soluble dietary fiber and probiotics help sustain gut health and immunity. Various nutrients support a healthy vascular system and natural energy.



PLEASE NOTE

- Start slowly and work up to the full dosage in two weeks.

ReCODE Core Kit (continued)

ReCODE Evening Balance

Suggested Use: In the evening, mix two level scoops with water and drink.

ReCODE Evening Balance contains ingredients that have been shown to reduce stress and promote sleep, cognition, and memory by providing signaling and trophic support. It was designed to support the brain's neurotransmission systems and to reduce stress and promote sleep, while helping to sustain gut health and immunity.



ReCODE Daily Multivitamin

Suggested Use: Take 4 capsules daily with food.

ReCODE Daily Multivitamin provides nutritional support for optimal brain performance and overall good health. The formula includes essential and valuable nutrients that have been shown to promote cognition and memory.



ReCODE Daily Probiotics

Suggested Use: Take 2 capsules daily on an empty stomach.

ReCODE Probiotics contains clinically-proven beneficial bacterial strains that may promote cognition and memory, enhance gastrointestinal and immune health, decrease stress-induced digestive discomfort, and promote a positive mood. Ingredients in ReCODE Probiotics have been shown to:

- Offer probiotic support for the gut-brain axis.
- Crowd out harmful bacteria in the gut.
- Create compounds that help inhibit the harmful bacteria.
- Communicate directly with the immune system that resides in the gut.





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ReCODE Core Kit (continued)

ReCODE Daily OMEGA - 3S

Suggested Use: Take 2 soft gels daily with food.

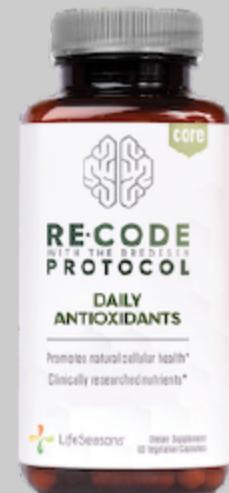
ReCODE Daily Omega-3s includes EPA and DHA, fatty acids that may promote cognition, memory, and other normal brain functions. Ingredients in ReCODE Daily Omega-3s have been shown to provide anti-inflammatory and pro-synaptic balance for the brain, promote a healthy inflammatory response within the body, and soothe the discomfort and inflammation of everyday aches and pains.



ReCODE Daily Antioxidant

Suggested Use: Take 2 capsules daily, with or without food.

Natural body processes create cellular waste in the form of molecules known as free radicals. Left unchecked, free radicals can bounce around causing cellular and tissue stress. They also can lead to cognitive decline and other age-related concerns. Daily Antioxidants is a well-researched blend of nutrients that can neutralize free radicals and nourish the brain and nervous system.



Additional Supplements

- Whole Coffee Fruit Extract (WCFE) 200mg each morning.



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Personalized Supplements with LifeSeasons

ReCODE Type 1 – Inflammatory

Suggested Use: Take 2 capsules daily on an empty stomach or with good fats, such as avocado or nuts.

ReCODE Type 1 – Inflammatory provides support for individuals on the Bredesen Protocol who have been identified as Type 1 – Inflammatory on the ReCODE Report.

- Contains turmeric extract, a potent anti-inflammatory that also binds to the amyloid associated with Alzheimer's disease.
- Has been shown to soothe the discomfort and inflammation of everyday aches and pains.
- Contains enzymes, herbal extracts and whole herbs to provide synergistic benefits.

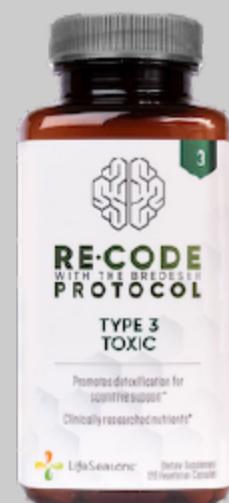


ReCODE Type 3 – Toxic

Suggested Use: Take 4 vegetarian capsules daily with food.

ReCODE Type 3 – Toxic has been specially formulated to optimize detoxification, including liver support and kidney support, and is designed to provide support for individuals on the Bredesen Protocol who have been identified as Type 3 – Toxic on the ReCODE Report.

- Includes nutrients and herbs that may promote healthy cognition and memory for those who have been exposed to toxicity in their environment.
- Enhances healthy liver function.
- Supports liver detoxification.
- Supports healthy levels of glutathione, a key detoxificant and antioxidant.
- Supports healthy bile flow.





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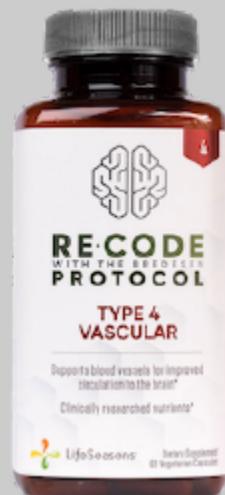
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ReCODE Type 4 – Vascular

Suggested Use: Take 2 vegetarian capsules daily with or without food.

ReCODE Type 4 – Vascular is formulated with nutrients and herbs that may promote healthy cognition and memory and provide nourishing antioxidants. ReCODE Type 4 – Vascular provides support for individuals on the Bredesen Protocol who have been identified as Type 4 – Vascular on the ReCODE Report.

- Supports healthy circulation.
- Supports vascular system health.
- Protects against free radical damage.



Based on Your Blood Tests You Should Also Consider

- Your TSH of 2.6 uIU/ml suggests that you should talk to your practitioner about your thyroid status, especially if you have symptoms such as feeling cold or weight gain or constipation or depression, which may suggest low thyroid activity. Your practitioner may want to perform further tests or talk to you about thyroid supplementation.
- Your LDL is 105 mg/dl, which is suboptimal. You may wish to talk with your practitioner about checking LDL particle number, which is a specialized test to determine whether your LDL is the "benign" LDL or the more concerning LDL.



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Personalized Supplement Alternatives

For individuals who would like to take their preferred brand of supplements or do not have access to the ReCODE formulation, you may purchase the list of personalized supplements listed below. **Note: Due to formulation requirements and alternative ingredients, some supplements may not match completely with the ingredients in LifeSeasons suggested formulation.**

- Alpha-lipoic acid (or R-lipoic acid)** 100 mg once daily
- Ashwagandha (Withania somnifera)** 500 mg with meals
- Bacopa monnieri** 350 mg with meals
- Citicoline** 500 mg once or twice per day
- CoQ (Ubiquinol)** 200 mg as ubiquinol
- Curcumin** 1 g

To optimize absorption, take this on empty stomach or with good fats (such as avocado, nuts, or olive oil).

- Gotu kola** 500 mg once or twice per day with meals
- MCT oil** 1 tbsp

Start at one teaspoon and work up over 1 week, in order to avoid diarrhea.

- Magnesium threonate** 2 g

2 grams of magnesium threonate contains 144 mg of magnesium. Many prefer to take at night since it may cause some drowsiness.

- Manganese** 10 mg

For a detailed description of each supplement, see our guide on supplements [Supplements: Are Supplemental](#).

- Methyl-folate** 2 mg each day
- Methylcobalamin (methyl-B12)** 1 mg once per day
- Mixed tocopherols and tocotrienols** 400 IU once per day
- N-acetylcysteine** 500 mg two times per day
- Nicotinamide riboside** 100 mg 2-3 times per day
- Omega-3 fats (e.g., DHA and EPA)** 1 g once or twice per day
- PQQ (pyrroloquinoline quinone)** 10 mg once or twice per day
- Probiotics and prebiotics** once per day
- Pyridoxal 5-phosphate (P5P)** 20 mg once per day
- Resveratrol** 100 mg once per day
- Specialized pro-resolving mediators (e.g., SPM Active)** twice per day, for 1 month
- Thiamine (vitamin B1)** 50 mg
- Vitamin C (ascorbate)** 1 g once or twice per day
- Whole coffee fruit extract (WCFE)** 200 mg each morning
- Zinc Picolinate** 50 mg once per day



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REVIEWING THE B7 ACTION PLAN

We've put together specific action plans to help you incorporate the seven foundational strategies that synergistically create neuroplasticity and support cognition: nutrition, exercise, sleep, stress, brain stimulation, detox, and supplements.

NUTRITION



The most effective nutrition for support of brain health and reversal of cognitive decline includes a mildly ketogenic, plant-rich, highly nutritive diet combined with nightly fasting of a minimum of 12 hours with at least 3 before bed. This approach is summarized as the KetoFLEX 12/3 diet – a heavily plant-based, nutrient-dense, whole foods diet, that emphasizes local, organic, and seasonal non-starchy vegetables from every color of the rainbow, combined with an adequate amount of protein, and generous amounts of healthy fat – and utilizes multiple mechanisms to support brain health, such as increased energy (via ketosis), insulin sensitivity, reduced inflammation, improved vascular health, and detoxification. For additional information see [NUTRITION: KetoFLEX 12/3 summary](#).

EXERCISE



- 1 Increase movement throughout the day. Avoid sitting for extended periods. Look for opportunities to be active. Perform household chores with vigor. Always take the stairs in lieu of an elevator or escalator. Walk to your destination when possible. If you must drive, try to park as far away from your intended stop as possible to increase your overall activity level.
- 2 Take a daily walk, preferably outdoors. Research shows that spending time in nature confers healing properties. Work up to at least 30 minutes per day. Walk with a purpose with the intention of increasing your heart rate to derive optimal benefit. It's a good idea to vary your speed throughout your walk, with periods of running if you are able.
- 3 Adopt a strength training program 3-4 times per week. If you've never engaged in strength training before, consider working with a personal trainer to develop a personalized program for overall body strength, with a special emphasis on building leg strength.
- 4 Consider adding a few mind-body exercise classes (or solo practice once proficient) per week, such as yoga, tai chi, or ballroom dancing.
- 5 See [EXERCISE: "Just Do It"](#) for in depth information.



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SLEEP



- 1 Try to get 7-8 hours of quality sleep every night, ideally winding down when the sun sets and awakening with the sunrise. If your work prevents this schedule, do your best to still achieve 7-8 hours of restorative sleep by totally darkening the room or by using a sleep mask.
- 2 If you are currently using a prescription sleep aid, work with your healthcare practitioner to wean off. The vast majority of sleep medications have negative long-term consequences for neurological health. Instead, adopt a sleep hygiene program and consider supplements that will support and protect your brain health.
- 3 Rule out obstructive sleep apnea. Periodically check your nighttime oxygen saturation to ensure that your brain is receiving adequate oxygenation while you sleep.
- 4 Learn more at [SLEEP: The Antidote](#).

STRESS



- 1 Adopt a daily stress management practice that could include mindfulness, meditation, Neural Agility, the Dynamic Neural Retraining System, HeartMath, prayer, tai chi, qigong, or yoga. Learn about each strategy in [STRESS: Just Breathe](#) and experiment to find what combination works best for you.
- 2 Build daily stress management habits into your daily schedule.
 - Give yourself permission for self-care
 - Don't over-schedule
 - Use lists
 - Unplug from technology
 - Avoid multi-tasking
 - Exercise, especially outdoors
 - Get 7-8 hours of quality sleep.

BRAIN STIMULATION



- 1 **Stay socially active.** It's especially important to build and maintain a strong support system. Research shows that those with strong social connections are 46% less likely to develop dementia.
- 2 **Identify and nurture your purpose.** Research shows that having a sense of purpose is a strong determinant of both overall health and mortality. Older adults who nurture their "passions" score much higher on cognitive testing than their less purposeful counterparts.
- 3 **Engage in lifelong learning.** Those with more education are less likely to develop dementia. Everyone can benefit from this, regardless of your level of formal education. Challenge yourself to continue learning in ways that are pleasurable. Take a class focused on a topic that fascinates you, learn a foreign language or musical instrument, or simply challenge yourself to crosswords or sudoku puzzles.
- 4 **Listen to music.** Turn off the TV and listen to music instead. Research shows that music stimulates deep neural connections and can positively affect gene expression to optimize hormone levels.
- 5 **Challenge yourself with daily brain training.** Research shows that brain training can help to create neuroplasticity. We recommend Brain HQ because of the strong science supporting its efficacy. Try to practice 90 minutes each week. Each exercise is broken up into two minute bites so that you can easily squeeze it into your daily schedule. Don't get too competitive with yourself. Keep it challenging, yet fun.
- 6 See [BRAIN STIMULATION: Upsizing](#) for more detailed information.

DETOX



- 1 Ensure that the air you breathe, the water you drink, the food you eat, the home you live in and the toiletries, cosmetics, and cleaning supplies that you use are as toxin-free as possible.
- 2 Practice good hygiene to maintain internal intact barriers (gut lining, blood-brain barrier, oral, nasal) as well as external (skin, nails, hair).
- 3 Dental hygiene is especially important as oral microbes have been repeatedly identified in the brains of those with Alzheimer's disease. See [Oral Health for Brain Health](#) to learn more.
- 4 Optimize detoxification to build resilience.
- 5 See [DETOX: Beware of Dementogens](#) for details.



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PERSONALIZED SUPPLEMENT SHOPPING LIST

Effective use of supplements is critical for best outcomes, please remember these are by definition supplementary to provide effective synaptic support. The personalized list here is based on your laboratory findings and designed to enhance synaptic formation and maintenance.

In order to keep pill and capsule numbers to a minimum we have worked with [LifeSeasons](#) on a special supplement line for ReCODE.

If you are currently taking medications such as blood thinners, please consult with your physician before starting supplements.

ReCODE Core Kit

- ReCODE Morning Balance
- ReCODE Evening Balance
- ReCODE Daily Multivitamin
- ReCODE Daily Probiotics
- ReCODE Daily OMEGA - 3S
- ReCODE Daily Antioxidant

Subtype

- ReCODE Type 1 - Inflammatory
- ReCODE Type 3 - Toxic
- ReCODE Type 4 - Vascular

Additional Supplements

- Whole Coffee Fruit Extract (WCFE) 200mg each morning.

Personalized Supplement Alternatives:

For individuals who would like to take their preferred brand of supplements or do not have access to the ReCODE formulation, you may purchase the list of personalized supplements listed below. **Note: Due to formulation requirements and alternative ingredients, some supplements may not match completely with the ingredients in LifeSeasons suggested formulation.**

- Alpha-lipoic acid (or R-lipoic acid)** 100 mg once daily
- Ashwagandha (Withania somnifera)** 500 mg with meals
- Bacopa monnieri** 350 mg with meals
- Citicoline** 500 mg once or twice per day
- CoQ (Ubiquinol)** 200 mg as ubiquinol
- Curcumin** 1 g

To optimize absorption, take this on empty stomach or with good fats (such as avocado, nuts, or olive oil).

- Gotu kola** 500 mg once or twice per day with meals

- MCT oil** 1 tbsp

Start at one teaspoon and work up over 1 week, in order to avoid diarrhea.

- Magnesium threonate** 2 g

2 grams of magnesium threonate contains 144 mg of magnesium. Many prefer to take at night since it may cause some drowsiness.

- Manganese** 10 mg

- Methyl-folate** 2 mg each day



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- Methylcobalamin (methyl-B12)** 1 mg once per day
- Mixed tocopherols and tocotrienols** 400 IU once per day
- N-acetylcysteine** 500 mg two times per day
- Nicotinamide riboside** 100 mg 2-3 times per day
- Omega-3 fats (e.g., DHA and EPA)** 1 g once or twice per day
- PQQ (pyrroloquinoline quinone)** 10 mg once or twice per day
- Probiotics and prebiotics** once per day
- Pyridoxal 5-phosphate (P5P)** 20 mg once per day
- Resveratrol** 100 mg once per day
- Specialized pro-resolving mediators (e.g., SPM Active)** twice per day, for 1 month
- Thiamine (vitamin B1)** 50 mg
- Vitamin C (ascorbate)** 1 g once or twice per day
- Whole coffee fruit extract (WCFE)** 200 mg each morning
- Zinc Picolinate** 50 mg once per day

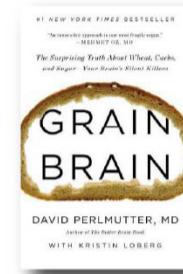
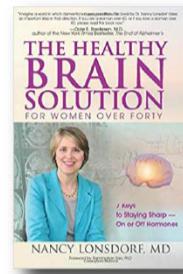
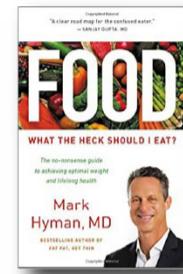
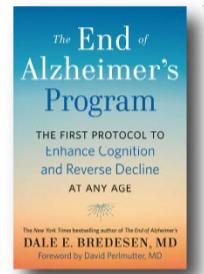
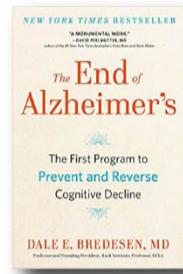
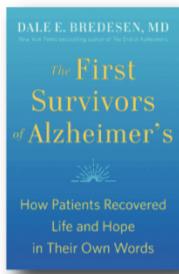


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RECOMMENDED READING

Reversing cognitive decline is now possible – it is happening in thousands of people every day – and this goes hand in hand with optimizing cognition. A finely-tuned brain will bring you all sorts of dividends for many years to come, and this simply means getting several different systems to work together as a network – from nutrition to exercise to sleep to growth factors to brain training, and so on. The books listed here are excellent, readable references to support cognition for decades to come. In addition to general references for cognition, we list specific titles for those who are at risk for a specific subtype of cognitive decline, such as toxic (type 3) or vascular (type 4).



- **The First Survivors of Alzheimer's** by Dr. Dale Bredesen
- **The End of Alzheimer's** by Dr. Dale Bredesen
- **The End of Alzheimer's Program** by Dr. Dale Bredesen (with Julie Gregory and Dr. Aida Lasheen Bredesen)
- **The UltraMind Solution** by Dr. Mark Hyman
- **FOOD: What the Heck Should I Eat?** by Dr. Mark Hyman
- **FOOD: What the Heck Should I Cook?** by Dr. Mark Hyman
- **Grain Brain** by Dr. David Perlmutter
- **Brain Maker** by Dr. David Perlmutter
- **The Brain Body Diet** by Dr. Sara Gottfried
- **The Healthy Brain Solution for Women Over Forty** by Dr. Nancy Lonsdorf
- **Fat for Fuel** by Dr. Joseph Mercola
- **KetoFast** by Dr. Joseph Mercola
- **The Longevity Diet** by Dr. Valter Longo (Keep the overall concept of KetoFLEX 12/3 in mind.)
- **Ketotarian** by Dr. Will Cole
- **31-Day Food Revolution** by Ocean Robbins (Keep the overall concept of KetoFLEX 12/3 in mind.)
- **How Not to Die** by Michael Greger (Keep the overall concept of KetoFLEX 12/3 in mind.)
- **Super Immunity** by Joel Fuhrman (Keep the overall concept of KetoFLEX 12/3 in mind.)



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SLEEP OPTIMIZATION

- [Why We Sleep](#) by Dr. Matthew Walker
- [The Sleep Revolution](#) by Arianna Huffington

STRESS MANAGEMENT

- [Wherever You Go There You Are](#) by Dr. Jon Kabat-Zinn
- [Brain Wash](#) by Dr. David Perlmutter
- [Resilient](#) by Rick Hanson
- [Thrive](#) by Arianna Huffington
- [Stress Less, Accomplish More](#) by Emily Fletcher

AUTOIMMUNE DISEASE

- [The Wahls Protocol \(2020\)](#) by Dr. Terry Wahls
- [The Plant Paradox](#) by Dr. Steven Gundry

MORE ON TYPE 3 (TOXIC)

- [The Toxin Solution](#) by Dr. Joseph Pizzorno
- [Toxic: Heal Your Body](#) by Dr. Neil Nathan
- [Surviving Mold](#) by Dr. Ritchie Shoemaker
- [Wired for Healing](#) by Annie Hopper
- [The Lyme Solution](#) by Dr. Darin Ingels
- [How Can I Get Better? An Action Plan for Treating Resistant Lyme and Chronic Disease](#) by Dr. Richard Horowitz

MORE ON TYPE 4 (VASCULAR)

- [What Your Doctor May Not Tell You About Heart Disease](#) by Dr. Mark Houston (Keep the overall concept of KetoFLEX 12/3 in mind.)
- [Personalized and Precision Integrative Cardiovascular Medicine](#) by Dr. Mark Houston (Keep the overall concept of KetoFLEX 12/3 in mind.)
- [Wheat Belly](#) by Dr. William Davis



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MORE ON TYPE-5 (TRAUMATIC)

- [The Brain that Changes Itself](#) by Norman Doidge



As you know, the Bredesen Protocol has many different elements that must be adhered to in order to achieve optimum success. Our goal has been to provide the necessary tools and features to make it easier for you to adhere to the protocol. One recent improvement is the LifeSeasons supplements which greatly reduce the number of different compounds to take. Another significant improvement is the newly released iPhone app for ReCODE and its companion Apple Watch app.

Our ReCODE app focuses on tracking and reminding you about your protocol tasks for the day. App users have told us that the app helped them organize and simplify their adherence to the protocol. For example, many of the users love the fasting timer which reminds you when to eat after your fast is over.

The app also provides a convenient way to access all of the resources available to you via your subscription. You can access your ReCODE Reports, view assessment data (including CNS Vital Signs, AQ21, and MoCA scores), post and read forum messages, access all guides, and view recent and past Town Halls.

Some of you have requested more information on how to get the app working for you – so, we have created a series of short tutorial videos that will help you navigate the app.



[Watch the Tutorial Videos](#)

[Download the Mobile App](#)

We urge every ReCODE and PreCODE subscriber with an iPhone to install the app. We are investing heavily in improving your experience and effectiveness with the Bredesen Protocol, so expect to see many more new app features in the near future.





Using The App

How do I login to the App? You will need to use the same User ID and Password that you use to login to the website (the first time you login, you will be presented with standard legal agreements such as terms of use, etc. This is a one-time process, and you will not see them again at login).

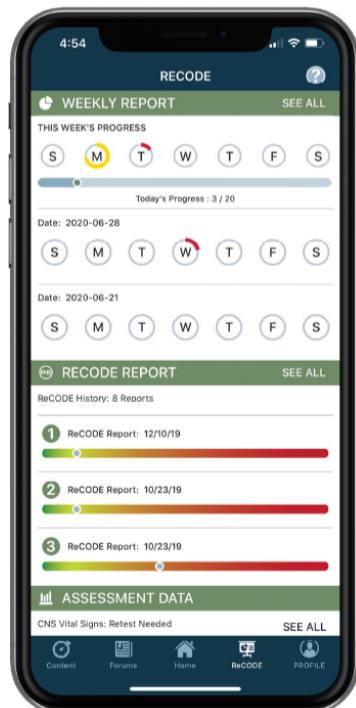
What can you do with the App? Some of you have shared with us that embracing the many lifestyle changes, and following the Bredesen Protocol has been a challenging and sometimes overwhelming process. We had this in mind as we developed the app, so let's dive right in and review some of the main features.

Home Screen – At the top of the screen, you will see a snapshot of your progress for the week organized by day of the week and then below that, for the current day. A strip of round icons below the progress area contains buttons that display your notifications and a built-in tutorial. The lower portion of the screen contains a daily to-do list of your tasks sorted by morning, afternoon, and evening. At the very bottom of the screen, you will see a row of icons that navigate you to the other main sections of the app.

Daily Tasks – From the Home Screen, you can organize and track essential tasks for your daily routine such as fasting, brushing your teeth, exercising, etc., or create your own customized tasks to help keep your daily routine on track.

Content – View and read the most recent nutritional information, lifestyle guides, and town halls with Dr. Bredesen to help you follow the Bredesen Protocol.

Forums – Share and learn from fellow participants through our forum. You can contribute and connect with our ever-growing online digital community.

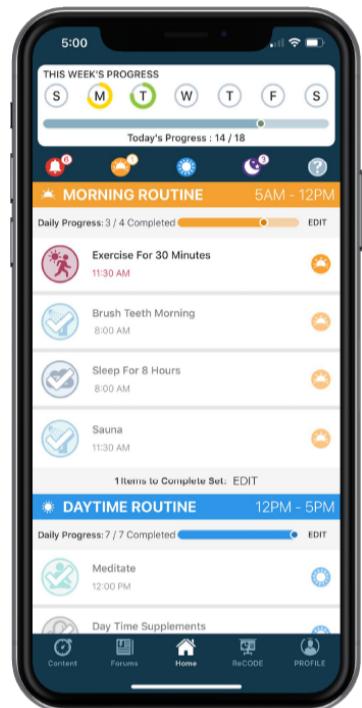


ReCODE – Access your ReCODE Report history as well as the result history of your other cognitive assessments (e.g., MoCA, AQ21, CNS Vital Signs, etc.) to help track your progress.

Profile – Accessing your care team contact information and changing your password can be performed from the Profile page.

FAQs – The frequently asked questions about the app can be viewed here.

App Support – More exciting features are coming with future versions of the app: Daily health metric integration, additional nutritional support, and more. We would love to hear from you on how we can improve the app. If you have any questions about the app, contact customer support at (800) 450-0805, or send an email to support@ahnphhealth.com.





ALZHEIMER'S SUBTYPE OVERVIEW

TYPE
1

INFLAMMATORY

Type 1 is associated with inflammatory markers such as hs-CRP, and the inflammation may be due to infections (often unrecognized), leaky gut, suboptimal diet, or other factors. Risk for type 1 is increased by ApoE4, chronic infections, trans fats, damage to your gut microbiome, and other factors.

TYPE
1.5

GLYCOTOXIC

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, thus increasing risk for type 1. Meanwhile, the responding high insulin levels cause insulin resistance, reducing the trophic effects of insulin and increasing risk for type 2. Risk for type 1.5 is increased by ApoE4 and by type 2 diabetes and pre-diabetes.

TYPE
2

ATROPHIC

Type 2, atrophic Alzheimer's, is associated with reduction (especially rapid reduction) in trophic support such as vitamin D, thyroid hormone, vitamin B12, estradiol, testosterone, insulin, and neurotrophins. Risk for type 2 is increased by ApoE4, early hysterectomy/oophorectomy (40 years of age or younger) without hormone replacement, low vitamin D levels, and in some cases menopause/andropause. It is important to rule out sleep apnea, as well, since optimal oxygen support for the brain is critical to avoid type 2 Alzheimer's.

TYPE
3

TOXIC

Type 3 is quite different from types 1, 1.5, and 2, and often presents with features other than (or in addition to) memory loss, such as depression, problems calculating, organizing, following instructions, or finding words. 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 increased by a poor detoxification system (e.g., due to reduced function of liver or kidneys), constipation, air pollution, exposure to smoke, repeated exposure to fish with high mercury levels, toxins from specific molds (*Stachybotrys*, *Penicillium*, *Aspergillus*, *Chaetomium*, and *Wallemia*), pesticides, herbicides (such as weed killer), and other toxic exposures.

TYPE
4

VASCULAR

We used to think of vascular disease as being unrelated to Alzheimer's disease, but over the past several years it has become clear that vascular abnormalities contribute importantly to Alzheimer's disease. In type 4, chronic vascular disease (which may be associated with high homocysteine or vascular amyloid or an abnormal lipid profile or breach of the blood-brain barrier, among other contributors) is associated with the development of Alzheimer's disease. Risk for type 4 (vascular) Alzheimer's disease is increased by high triglyceride levels, low HDL levels, inflammation that compromises blood vessels, sleep apnea, and poor diet, among other factors.



ALZHEIMER'S SUBTYPE OVERVIEW

TYPE
5

TRAUMATIC

When the brain is traumatized, for example due to an auto accident, the amyloid associated with Alzheimer's disease is produced as a response. Trauma is thus a risk factor for Alzheimer's disease. In many cases, the amyloid is removed, and thus chronic traumatic encephalopathy (CTE, which occurs in football players among others, and was featured in the film *Concussion*) typically lacks amyloid, but is related to Alzheimer's disease in featuring neurofibrillary tangles made of the tau protein. Risk for type 5 (traumatic) Alzheimer's disease is increased with sports-related head injuries (including repeated mild head injury without concussion), motor vehicle accidents, falls, whiplash head movements, and other forms of head trauma.



You and your practitioner may also wish to consider the following tests:

- IL-6 Serum
- Free Testosterone Serum
- Ceruloplasmin Serum
- Mercury %ile
- Cadmium Whole Blood
- C4A Plasma
- TGF-beta-1
- MSH Plasma
- LDL Particle Number
- Glutathione (uM)
- Selenium
- Vitamin C
- Vitamin B6 Plasma
- Magnesium Serum



REMINDER

YOUR NEXT LAB TESTS SHOULD BE COMPLETED AFTER SIX MONTHS

2023-09-01

The following pages include all of your lab results, genetic results, and assessments utilized to generate your ReCODE Report. If available, each result will include a color code indicating whether the result is within the ReCODE Target range, the raw value with units, reported date of the result, and the source of the result.

Target ranges are color coded Green, Gold, and Red. Green results meet the ReCODE Target range, Gold results are within the normal reference range defined by the Apollo Health lab, and Red results are outside of normal range. Please note, these ranges and values may not match your preferred lab's reference ranges. If you are not using the Apollo Health lab and the lab test is significantly different, the ranges and ReCODE algorithm may be inaccurate, so it is important to make sure that compatible lab tests are used.

Please note that best outcomes require bringing lab values not simply to the minimum "normal" levels, but to optimal functional levels—this is well documented, for example, with homocysteine and B12. Please consult with a trained ReCODE Practitioner as these defined ranges are set as guidelines.

Your results may be sourced from various data sources, which may include Apollo Health's partnered lab, trained ReCODE Practitioners, or conducted assessments. Each result will be labeled with a data source, if available.

MEDICAL ADVICE, DIAGNOSIS AND TREATMENT BASED ON ANY REPORTED TARGET RANGES AND VALUES ARE AT THE SOLE DISCRETION OF A TRAINED RECODE PRACTITIONER OR YOUR PHYSICIAN.

Please consult with your trained ReCODE Practitioner regarding retesting procedures.



RAW RESULTS

PARTICIPANT: GEORGI MARKOV
REPORT DATE: MARCH 1, 2023

LEGEND:

OPTIMAL FOR RECODE - SUBOPTIMAL - ABNORMAL
 VALUES IMPROVED TO OPTIMAL RANGE
 VALUES IMPROVED BUT STILL NEED IMPROVEMENT

CONSULT YOUR PHYSICIAN WITH ANY QUESTIONS

TEST	REPORT VALUE	TARGET RANGES	DATE	SOURCE
General Health				
Age	41			
Sex	Male		2023-02-12	
Basal Body Temperature	92.0 deg. F		2023-02-15	self-reported
BMI	● 22.6	18 - 25	2023-02-15	self-reported
Comment:	Body mass index = (703 x weight in pounds)/ (height in inches squared)			
Systolic Blood Pressure	120		2023-02-15	self-reported
Diastolic Blood Pressure	65		2023-02-15	self-reported
Height	71.65 in		2023-02-15	self-reported
Weight	161.6 lbs		2023-02-15	self-reported
Wrist Size	6.5 in		2023-02-15	self-reported
Assessments				
AQ-21 score	● 7		2023-02-15	self-reported
CNS Memory	● Above Ave.		2023-02-14	
CNS Verbal Memory	● Above Ave.		2023-02-14	
CNS Visual Memory	● Above Ave.		2023-02-14	
CNS Psychomotor Speed	● Above Ave.		2023-02-14	
CNS Processing Speed	● Above Ave.		2023-02-14	
CNS Executive Function	● Above Ave.		2023-02-14	
CNS Social Acuity	● Average		2023-02-14	
CNS Reasoning	● Above Ave.		2023-02-14	
CNS Simple Attention	● Average		2023-02-14	
CNS Motor Speed	● Above Ave.		2023-02-14	
SLU Mental Status score	29		2023-02-15	
ReCODE Cognitive Index	84		2023-02-14	self-reported



RAW RESULTS

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OPTIMAL FOR RECODE - SUBOPTIMAL - ABNORMAL
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TEST	REPORT VALUE	TARGET RANGES	DATE	SOURCE
Personal History				
Family History of Dementia	No		2023-02-15	self-reported
Diabetes	No		2023-02-15	self-reported
Medication For Diabetes	No		2023-02-15	self-reported
Medication For Diabetes	No		2023-02-15	self-reported
Simple Carbohydrates in Diet	Yes		2023-02-15	self-reported
Depression	No		2023-02-15	self-reported
Episodes of Aggressive Behavior	No		2023-02-15	self-reported
History of Concussions	No		2023-02-15	self-reported
History of Head Trauma	No		2023-02-15	self-reported
Vomiting After Head Trauma	No		2023-02-15	self-reported
Loss of Consciousness	No		2023-02-15	self-reported
Alcohol Related Withdrawal or Seizures	No		2023-02-15	self-reported
Illicit Drug Use	No		2023-02-15	self-reported
Anti-Testosterone Medication	No		2023-02-15	self-reported
History of Heart Attack or Angina	No		2023-02-15	self-reported
History of Hypertension	No		2023-02-15	self-reported
History of Vascular Disease	Yes		2023-02-15	self-reported
Hysterectomy Before 41	No		2023-02-15	self-reported
Hysterectomy Before 52	No		2023-02-15	self-reported
History of Lyme Disease or Tick Bite	No		2023-02-15	self-reported
Meningitis	No		2023-02-15	self-reported
Personal History of Cancer	No		2023-02-15	self-reported
Arthritis	No		2023-02-15	self-reported
Chronic Fatigue	No		2023-02-15	self-reported
Chronic Sinus Problems	No		2023-02-15	self-reported
Daytime Sleepiness	No		2023-02-15	self-reported
Highly Sensitive to Chemicals	No		2023-02-15	self-reported
Ice Pick Pains	No		2023-02-15	self-reported
Snoring	No		2023-02-15	self-reported
Statin Drugs	No		2023-02-15	self-reported
Vertigo	No		2023-02-15	self-reported



RAW RESULTS

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OPTIMAL FOR RECODE - SUBOPTIMAL - ABNORMAL
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CONSULT YOUR PHYSICIAN WITH ANY QUESTIONS

TEST	REPORT VALUE	TARGET RANGES	DATE	SOURCE
Other Risk Factors				
Rapid Cognitive Decline	No		2023-02-15	self-reported
Gluten Sensitivity	No		2023-02-15	self-reported
Consumption of Seed Oils	No		2023-02-15	self-reported
Constipation	Yes		2023-02-15	self-reported
Leaky Blood-Brain Barrier	● No		2023-02-15	self-reported
Leaky Gut	● No		2023-02-15	self-reported
Tremor at Rest	No		2023-02-15	self-reported
Difficulty Looking Up or Down	No		2023-02-15	self-reported
Headaches	● No		2023-02-15	self-reported
Loss of Sense of Smell	No		2023-02-15	self-reported
Alcohol Daily Consumption	No		2023-02-15	self-reported
Mitochondrial Damaging Agents	● No		2023-02-15	self-reported
Neuroactive Medications	No		2023-02-15	self-reported
History of Atrial Fibrillation	No		2023-02-15	self-reported
Personal History of Ischemic Stroke (non-bleeding)	No		2023-02-15	self-reported
Family History of Ischemic Stroke (non-bleeding)	No		2023-02-15	self-reported
Personal History of Hemorrhagic Stroke	No		2023-02-15	self-reported
Family History of Hemorrhagic Stroke	Yes		2023-02-15	self-reported
Emphysema or Bronchitis	Yes		2023-02-15	self-reported
Herpes	No		2023-02-15	self-reported
Positive Lyme Disease Test	No		2023-02-15	self-reported
Anesthesia After 40 Years Old	No		2023-02-15	self-reported
Anesthesia After 40 Two Or More Times	No		2023-02-15	self-reported
Mold Exposure	● Yes		2023-02-15	self-reported
Poor Oral Hygiene	Yes		2023-02-15	self-reported
Presence of Dental Amalgams	No		2023-02-15	self-reported
Presence of Root Canals	Yes		2023-02-15	self-reported
More Than 3 Dental Amalgams	No		2023-02-15	self-reported
Sleep Less Than 7 Hours/Night	● Yes		2023-02-15	self-reported
New Late Sleeping Patterns	No		2023-02-15	self-reported
REM Behavioral Disturbance	No		2023-02-15	self-reported
Sleep Apnea or Hypopnea	No		2023-02-15	self-reported
Problems Calculating	No		2023-02-15	self-reported
Problems Reading	No		2023-02-15	self-reported
Problems With Finding Words	Yes		2023-02-15	self-reported
Problems With Organizing	No		2023-02-15	self-reported
Problems With Recognizing Faces	No		2023-02-15	self-reported
Saying Inappropriate Things	No		2023-02-15	self-reported
Delusions	No		2023-02-15	self-reported



RAW RESULTS

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● OPTIMAL FOR RECODE - ● SUBOPTIMAL - ● ABNORMAL
👍 VALUES IMPROVED TO OPTIMAL RANGE
👉 VALUES IMPROVED BUT STILL NEED IMPROVEMENT

CONSULT YOUR PHYSICIAN WITH ANY QUESTIONS

TEST	REPORT VALUE	TARGET RANGES	DATE	SOURCE
Apathetic Attitude	No		2023-02-15	self-reported
History of Passing Out	No		2023-02-15	self-reported
Loss of Empathy	No		2023-02-15	self-reported
Stealing Items	No		2023-02-15	self-reported
Visual Hallucinations	No		2023-02-15	self-reported
Cerebrospinal Fluid with ATI < 1.0	No		2023-02-15	self-reported
Genetics				
ApoE4 Copies	1		2023-03-01	ReCODE lab
Inflammation				
A/G Ratio	1.7	> 1.8	2023-03-01	ReCODE lab
hs-CRP Serum	1 mg/l	< 0.9 mg/l	2023-03-01	ReCODE lab
Glucose & Insulin				
Fasting Glucose Serum	84 mg/dl	70 – 90 mg/dl	2023-03-01	ReCODE lab
Fasting Insulin Serum	4.3 uIU/ml	3 – 5.5 uIU/ml	2023-03-01	ReCODE lab
Comment: May be lower if the participant has a low carb diet, has a healthy lifestyle, fasting glucose <85, and hemoglobin A1C < 5.1. Results may be higher if the participant is eating a sub-optimal diet.				
HOMA-IR	0.89	1.2 or lower	2023-03-01	
Hemoglobin A1c %	4.7 %	< 5.3 %	2023-03-01	ReCODE lab
Methylation				
Folate Serum	17.6 ng/ml	11 – 25 ng/ml	2023-03-01	ReCODE lab
Homocysteine Serum	8.3 uM	4 – 7 uM	2023-03-01	ReCODE lab
Vitamin B12 Serum	695 pg/ml	500 – 1500 pg/ml	2023-03-01	ReCODE lab
Hormones				
Cortisol Serum	12.5 ug/dl	10 – 18 ug/dl	2023-03-01	ReCODE lab
DHEA-Sulfate Serum	206 mcg/dl	150 – 500 mcg/dl	2023-03-01	ReCODE lab
Comment: Target range for men				
Estradiol Serum	15 pg/ml	< 39 pg/ml	2023-03-01	ReCODE lab
Comment: Target range for men				
Free T3 Serum	3.4 pg/ml	3.2 – 4.2 pg/ml	2023-03-01	ReCODE lab
Free T3:Reverse T3	14.17	> 20	2023-03-01	
Comment: For example, if free T3 is 3.2, reverse T3 should be < 16. Free T3: Reverse T3 ratio is calculated by 100 x (Free T3/ Reverse T3).				



RAW RESULTS

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TEST	REPORT VALUE	TARGET RANGES	DATE	SOURCE
Free T4 Serum	● 1.3 ng/dl	1.3 - 1.8 ng/dl	2023-03-01	ReCODE lab
Progesterone Serum	● 0.5 ng/ml	< 1.4 ng/ml	2023-03-01	ReCODE lab
Comment: Target range for men				
Reverse T3 Serum	● 24 ng/dl	< 20 ng/dl	2023-03-01	ReCODE lab
TSH Serum	● 2.6 uIU/ml	< 2 uIU/ml	2023-03-01	ReCODE lab
Testosterone Serum	● 747 ng/dl	500 - 1000 ng/dl	2023-03-01	ReCODE lab
Comment: Target range for men				
Vitamin D Serum	● 56 ng/ml	50 - 80 ng/ml	2023-03-01	ReCODE lab
Metals				
Calcium Serum	● 9.6 mg/dl	8.5 - 10.5 mg/dl	2023-03-01	ReCODE lab
Ferritin	● 139 ng/ml	40 - 160 ng/ml	2023-03-01	ReCODE lab
Potassium Serum	● 3.8 mEq/l	4.5 - 5.5 mEq/l	2023-03-01	ReCODE lab
RBC Mg	● 5.8 mg/dl	5.2 - 6.5 mg/dl	2023-03-01	ReCODE lab
Serum Copper (Total)	● 104 ug/dl	90 - 110 ug/dl	2023-03-01	ReCODE lab
Serum Zinc	● 63 ug/dl	90 - 110 ug/dl	2023-03-01	ReCODE lab
Toxins				
ALT Serum	● 15 units/l	< 25 units/l	2023-03-01	ReCODE lab
AST Serum	● 21 units/l	< 25 units/l	2023-03-01	ReCODE lab
Arsenic Whole Blood	● 3 ng/ml	< 7 ng/ml	2023-03-01	ReCODE lab
Comment: High values may be due to non-toxic organic arsenic compounds from seafood and therefore if your value is high we recommend retesting after 1 week off seafood.				
BUN Serum	15 mg/dl		2023-03-01	ReCODE lab
Blood Mercury	● 4 mcg/l	< 4 mcg/l	2023-03-01	ReCODE lab
Lead Whole Blood	● 1 mcg/dl	< 2 mcg/dl	2023-03-01	ReCODE lab
MMP9 Serum	● 529 ng/ml	< 332 ng/ml	2023-03-01	ReCODE lab
Platelet Count	● 276 thousand/ul	200 - 400 thousand/ul	2023-03-01	ReCODE lab
White Blood Cell Count	● 5 thousand/ul	6 - 10 thousand/ul	2023-03-01	ReCODE lab
Creatinine Serum	● 0.91 mg/dl	< 1.2 mg/dl	2023-03-01	ReCODE lab
Comment: Target range for men				



RAW RESULTS

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TEST	REPORT VALUE	TARGET RANGES	DATE	SOURCE
Lipids				
HDL Serum	61 mg/dl	> 50 mg/dl	2023-03-01	ReCODE lab
LDL Serum	105 mg/dl	< 100 mg/dl	2023-03-01	ReCODE lab
TG:HDL ratio	0.97	< 1.3 : 1	2023-03-01	
Total Cholesterol Serum	180 mg/dl	150 - 200 mg/dl	2023-03-01	ReCODE lab
Triglycerides Serum	59 mg/dl	40 - 90 mg/dl	2023-03-01	ReCODE lab
Antioxidants & Cytoprotection				
Albumin Serum	4.6 g/dl	4.5 - 5.5 g/dl	2023-03-01	ReCODE lab
Globulin Serum	2.7 g/dl		2023-03-01	ReCODE lab
Vitamin E Serum	16.6 mg/l	12 - 20 mg/l	2023-03-01	ReCODE lab
Advanced Assessments				
Neuropsych Executive Function %ile	91 %		2023-02-14	
Neuropsych Memory %ile	94 %		2023-02-14	