

Inflammation



← Target Very High ↑

very high hs-CRP 47.7 mg/L target: ≤ 1.0 mg/L

This level of hs-CRP is far above target, an indicator of inflammation. Inflammation plays a critical role in exacerbating aging and Alzheimer's disease, with multiple biological mechanisms involved.

Further evaluation by a physician is recommended.



↑ Very Low Target →

very low A/G 1.3 target: ≥ 1.8

A marker of inflammation status is the A/G ratio (the ratio of albumin to globulin). This A/G ratio is far below target, indicating a concern for inflammation or bacterial infection. Inflammation plays a critical role in exacerbating aging and Alzheimer's disease, with multiple biological mechanisms involved.

Periodontal disease is often associated with decreased A/G levels. These levels could indicate the severity of periodontal destruction.

Further evaluation by a physician is recommended.

Blood Sugar Imbalance



← Target ↑ Very High

high HgbA1c 5.8 % target: ≤ 5.6 %

Hemoglobin A1c is a test that shows the average level of blood sugar over the past 2 to 3 months. Specifically, the A1c test measures what percentage of hemoglobin, a protein in red blood cells that carries oxygen, is coated with sugar (glycated). The higher the A1c level, the poorer the blood sugar control and the higher the risk of diabetes complications.

Dyslipidemia

(nonfasting TOTc 188.0, on atorvastatin 20 mg)

Low Estrogen



↑ Very Low Target →

very low Total Testosterone 2.2 ng/dL target: ≥ 7.0 ng/dL

Hormone balance is important for synaptic balance and cognitive optimization. Furthermore, the reduction in testosterone in mid-life and beyond are temporally associated with reductions in cognitive optima. The generally-accepted normal levels for total testosterone are too inclusive; this low value should be addressed aggressively. Hormone levels should be normalized, which requires appropriate follow-up for any potential hormone side effects.

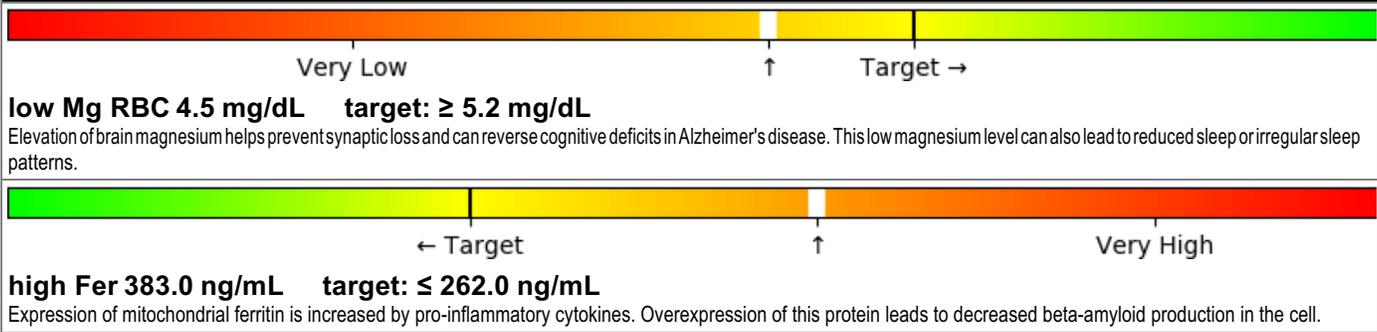


↑ Very Low Target →

low Pg 0.04 ng/mL target: ≥ 0.20 ng/mL

Progesterone has been shown to be neuroprotective, by attenuating beta-amyloid induced neuronal toxicity by inhibiting the mitochondrial-associated apoptotic pathway.

Imbalance in Essential Metals



Vitamin Imbalance

some serum vitamin concerns

Renal Insufficiency



Medication Concerns

Neuroactive drugs: atorvastatin 20 mg; gabapentin 100 mg; furosemide 20 mg; levocetirizine 5 mg; ranitidine 150 mg; cyclobenzaprine 5 mg; pantoprazole 40 mg

Lifestyle Concerns

sleep apnea
very low sleep duration 4.5 hours/night
doing no exercise

Family History

family history of dementia — father, Alzheimer's disease, 70

Notes on Cognitive Status

low SAGE 16

ISSUES FOR PHYSICIAN FOLLOW-UP

- The root cause of the following potential issues should be determined and addressed, before continuing with this care plan. Physician should prioritize resolution of these six issues. Recommendations in this report should then be reviewed and applied within the context of steps to resolve these.
 - A/G ratio is far below target, at 1.323.
 - hs-CRP (high sensitivity C-reactive protein) is far above target, at 47.7 mg/L.
 - Alkaline Phosphatase is far above target, at 138.0 IU/L.
 - LDH is far above target, at 256.0 IU/L.
 - Vitamin B9 (Folate, folic acid) is far above target, at 26.88 ng/mL.
 - Zinc, RBC is far above target, at 101.0 $\mu\text{g/mL}$.

Issue	Action	Reasoning
A/G ratio is far below target, at 1.323. hs-CRP (high sensitivity C-reactive protein) is far above target, at 47.7 mg/L.	Determine the proper treatment	A high level of inflammation has been observed, which can be a significant contributor to cognitive impairment. Its cause should be determined by an internist with urgency. Inflammation can arise from many sources, and may indicate the existence of additional medical issues. Focus on discovering the root causes of the inflammation and addressing those causes.
Alkaline Phosphatase is far above target, at 138.0 IU/L. LDH is far above target, at 256.0 IU/L. Vitamin B9 (Folate, folic acid) is far above target, at 26.88 ng/mL. Zinc, RBC is far above target, at 101.0 µg/mL.	Determine the proper treatment	Further assessment by physician is recommended as the test result is not normal and may indicate the existence of a medical issue other than cognitive impairment.
Ferritin is above target, at 383.0 ng/mL.	Determine the proper treatment	Discuss with physician steps to follow a protocol to manage high levels of iron (iron overload). Consider a comprehensive treatment regime to monitor and decrease iron levels.
Low Magnesium, RBC 4.5, low Calcium 9.5, and low Vitamin B12 (cobalamins) 398.0, in addition to taking a PPI (pantoprazole 40 mg). The PPI may be causing the nutrient depletion being seen in the serum levels.	Determine the proper treatment	Physician discussion about this medication is recommended.

Additional Diagnostics

Lab Test	Explanation
Blood Tests	
Cystatin C	Chronic kidney disease is probable, and should be further evaluated (stage 3a, eGFR 55).
Free Testosterone	Test result not supplied.
Insulin	Test result not supplied.
Urine Tests	
24-hour urine collection	Chronic kidney disease is probable, and should be further evaluated (stage 3a, eGFR 55).
Urinalysis, with screening for hematuria and albuminuria	Chronic kidney disease is probable, and should be further evaluated (stage 3a, eGFR 55).
Urinary lactulose/mannitol test of gut permeability	Leaky gut syndrome is probable, and should be further evaluated (high ALP 138, elevated Uric Acid 5.9, high hs-CRP 47.7, low A/G ratio 1.3).
Other Tests	
Arrays 2 and 10C, from Cyrex Laboratories	Leaky gut syndrome is probable, and should be further evaluated (high ALP 138, elevated Uric Acid 5.9, high hs-CRP 47.7, low A/G ratio 1.3). Screen for intestinal antigenic permeability (array 2) and comprehensive food immune reactivity (array 10C).
DNA test	Genomic analysis not supplied.
Fecal ova and parasites (O&P) exam	Intestinal parasites is probable, and should be further evaluated (high Eosinophils 5.1%, high Basophils 1.9%, high Monocytes 7.9%).
Glucose tolerance test (GTT)	Hemoglobin A1c is above target, at 5.8%.
Liver and spleen scan	Biliary tract obstruction is probable, and should be further evaluated (high ALT (SGPT) 43, high AST (SGOT) 35, high GGT 51, high ALP 138, high LDH 256).
SteatoTest for hepatic steatosis	Steatosis is possible, and should be further evaluated (high ALT (SGPT) 43, high LDH 256, high ALP 138).

Insufficient or Outdated Information

Category	Details	Last Obtained On
Vital Signs	Obtain missing Blood Pressure, Body Weight & Height, Temperature, Pulse Rate, Respiratory Rate, and SpO2.	

Current Medications

Medication	Dosage
lidocaine transdermal	TOP / b.i.d.
ibuprofen	800 mg, 1 pill / PO / q.p.m.
pantoprazole, Protonix	40 mg, 1 pill / PO / q.d.
benzonatate	100 mg, 1 pill / PO / t.i.d.
aspirin	81 mg, 1 pill / PO / q.d.
atorvastatin, Lipitor	20 mg, 1 pill / PO / q.d.
cyclobenzaprine	5 mg, 1 pill / PO / b.i.d.
losartan, Cozaar	50 mg, 1 pill / PO / q.d.
levocetirizine	5 mg, 1 pill / PO / q.p.m.
ranitidine, Zantac	150 mg, 1 pill / PO / q.d.
albuterol, Ventolin	90 mcg, 2 puffs / INH / p.r.n.
gabapentin	100 mg, 1 pill / PO / b.i.d.
furosemide	20 mg, 1 pill / PO / q.d.
potassium chloride	20 mEq, 1 pill / PO / b.i.d.
clopidogrel, Plavix	75 mg, 1 pill / PO / q.d.

A full list of potential drug-drug interactions is described in the extended Physician Report.

Potential Treatment Strategies

Regulated

29 potential drug-drug interactions (DDIs) have been identified across 15 current medications. Consider deprescribing some of the current medications, where appropriate, before prescribing the two pharmaceuticals newly recommended here.

Intervention, to consider for prescription	Dosage	Already Taking?	Reasoning	Guidance
Progesterone	100 mg / q.d.		Progesterone is far below target, at 0.04 ng/mL.	Bio-identical
Bioidentical estradiol with estriol (estradiol)	0.25 mg 4d/wk, 0.5 mg 3d/wk/CRM or TDP		For this post-menopausal woman, estradiol is 8.09 pg/mL and progesterone is 0.04 ng/mL. For optimal cognitive enhancement, use HRT to adjust estradiol to be in the range of 80 to 150 and progesterone to be in the range of 2 to 10. Adjust by symptoms, as needed.	Use a bioidentical formulation. If transdermal patch, change it once a week.

Rx, Supplements and Over-The-Counter

The recommended supplements below are in prioritized order. Start at the top and work down the list. Slowly ramp up the number of new supplements being taken. Consider starting with just the first three — L-tryptophan (tryptophan), melatonin, and L-5-methyltetrahydrofolate (5-MTHF, levomefolic acid) — and watching carefully for any side effects. Three days later, if okay, add the next three recommended supplements, and so on. No creatinine clearance (CrCl) value is available to guide supplement recommendations, so carefully evaluate any changes in kidney function or other side effects. Additionally, 29 potential drug-drug interactions (DDIs) have been identified across 15 current medications. Consider discontinuing some of the current medications, where appropriate, before starting the nine non-prescription medications newly recommended here.

Intervention, for diet supplementation	Dosage	Already Taking?	Reasoning	Guidance
L-tryptophan (tryptophan)	500 mg / tab / PO / q.h.s.		For sleep interrupted by awakening in the night and ruminations.	
Melatonin	0.5 mg / tab / PO or SL / q.h.s.		To normalize sleep, currently 4.5 hours/night, earlier to bed is preferable.	It is often sold as 1.0 mg pills, which can be broken in half. If the dose is too high, you may find you fall asleep but awaken after a couple of hours. Formulation should be identified as "USP Verified."
L-5-methyltetrahydrofolate (5-MTHF, levomefolic acid)	0.8 mg / PO / q.d.		Nonfasting Homocysteine is above target, at 12.8 μ mol/L.	
Pyridoxal 5'-phosphate (P5P, vitamin B6)	20 mg / PO / q.d.		Nonfasting Homocysteine is above target, at 12.8 μ mol/L.	
Cholecalciferol (vitamin D3)	2000 IU / softgels or drops / PO / q.d.		Vitamin D (25-hydroxy) is below optimal, at 42.3 ng/mL. (An optimal value is 55.0).	Best taken at the largest meal of the day, and along with calcium and magnesium (if those are among current medications).
Menatetrenone (vitamin K2)	600 mcg / cap or gts / PO / q.d.		Enhances absorption of cholecalciferol.	Best taken along with calcium and magnesium (if those are among current medications).
Magnesium L-threonate	144 mg / 3 caps / PO / q.p.m.		Magnesium, RBC is below target, at 4.5 mg/dL.	Ramp up slowly: 1 capsule/day the 1st week; 2 capsules/day the 2nd week; then 3 capsules/day.
Methylcobalamin (vitamin B12)	1 mg / PO or SL / q.d.		Nonfasting Homocysteine is above target, at 12.8 μ mol/L. Nonfasting Vitamin B12 (cobalamins) is below target, at 398.0 pg/mL.	Best taken with a meal.
Omega-3 docosahexaenoic acid (DHA)	1000 mg / cap / PO / q.d.		To increase synapse formation, to increase memory, to reduce inflammation.	Best taken at a meal with food high in protein, along with some "good fats" in the meal. Formulation should be free of peroxide.

Recommended Lifestyle

These recommendations tailor those in the FINGER study. In its April 2017 cover story, *Scientific American* summarized the study results: "A gold-standard clinical trial provides evidence that diet, exercise and an active social life can help prevent cognitive decline." ["A 2-year multidomain intervention of diet, exercise, cognitive training, and vascular risk monitoring versus control to prevent cognitive decline in at-risk elderly people (FINGER): a randomised controlled trial." Tiia Ngandu *et al.*, *The Lancet*, 385.9984 (2015): 2255-2263.]

Topic	Details	Comments
Physical Activity	Physical exercise has an anti-aging effect on the hippocampus region of the brain. Exercise at a moderate activity level 4 to 5 times each week, for 30 to 60 minutes each time. Heart rate should be raised (but not so much as to create too much stress, induce vascular problems, or damage joints). Include both cardiovascular exercise and resistance training (weight-bearing or weight-lifting strength exercises). Losing more than 10% of muscle mass disrupts function of the immune system.	Effective exercise to enhance neuroplasticity includes a vigorous aerobic component (such as dancing or brisk walking, working up to 3 miles) and alternates with or includes resistance training. Studies also show that novelty is helpful. For example, it is better to be playing during exercise than simply doing a treadmill. Novelty can be introduced through games, play with family members or friends, or activities with pets.
Stress Reduction	Include walks, music, meditation, naps, yoga, qigong, or whatever provides relaxation, at least once each day. Avoid highly stress-inducing behaviors, such as staying up all night, red-eye or international flights, unceasingly-stressful jobs, or staying in chronically-bad relationships. The importance of a positive attitude about life cannot be overstated.	People who are often stressed are more likely to experience brain shrinkage and increased production of the amyloid beta peptide. Some stresses are unavoidable, but keeping stress low is likely to be important for delaying or avoiding symptom onset.
Sleep	Seek treatment for sleep apnea, if it persists. Sleep duration is low, at about 4.5 hours/night. Increase to 8.0 hours/night, taking melatonin, 0.5 mg, just before sleep. Your bedtime (the time at which you go to bed), not wake time (not how late you sleep), makes the biggest difference in how much sleep you ultimately get. Bedtime before midnight is preferable.	
Autophagy	Fast at least 12 hours, between the last food in the evening and the first in the morning. Begin the fasting at least 3 hours before bedtime. Do this every night. Occasional daytime fasts are also helpful, such as fasting for a day (or most of a day) every few months.	Memory loss is observed in people producing too much amyloid beta peptide, which oligomerizes readily and can induce toxicity. A key mechanism for clearing amyloid beta is <i>autophagy</i> . Nightly fasts (and an occasional daytime fast) can inhibit the TOR pathway, induce autophagy, and clean up amyloid beta, damaged mitochondria (via mitophagy), and damaged or insoluble proteins.
Hygiene	Good hygiene is a key step in keeping inflammation low. Studies show a strong relationship between hygiene and cognition. Use a good electric toothbrush and a flosser to optimize dental hygiene daily, and get teeth cleaned at least twice a year. Shower regularly, clean carefully under the nails, and keep feet clean. Sinus cleansing is also appropriate.	Inflammation is a primary contributor to cognitive decline, and it has been identified in the blood serum analysis (very high hs-CRP 47.7; very low A/G 1.3). Finding the root cause of the inflammation is essential. Candida, pyroluria, and periodontal disease can often go unidentified. These are frequently found to be sources of chronic inflammation. A dentist or physician should regularly check their status.
Brain Stimulation	Push your mental abilities: become a tutor, learn a new language, take dance lessons and dance often, learn to play a musical instrument, memorize poems, even do math problems in your head. Read books (rather than short articles). Do complex crossword puzzles or Sudoku; good social activities include bridge and chess. These all support the promotion of neuronal connections. Participate in activities like these 4 or more times a week, for at least 30 minutes each time.	Frequent cognitive training via computer, such as the BrainHQ offering, has been shown to improve mild cognitive impairment. Consistent usage of the BrainHQ account also provides an interface for timely tracking of cognitive status.

Recommended Diet

Start with the eating guidelines in the MIND study. The foods and servings in the “Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND)” study are further personalized below, using observations from lab results, allergies, medications, and history. Additional personalization occurs when the genome data file is supplied. [“MIND diet associated with reduced incidence of Alzheimer’s disease.” M. C. Morris *et al.*, *Alzheimer’s and Dementia*, 2015 Sep, 11(9):1007-14.]

Fundamentals of a brain-healthy diet are good fats, soluble fiber, lean protein, and foods with low glycemic load, focusing on vegetables and fruits. The brain thrives on dietary fats, but there is a distinction between good and bad fats.

Enjoy **good fats**, which include monounsaturated and polyunsaturated fats, and medium-chain triglycerides (MCTs).

- Monounsaturated fats: Include nuts, avocados and avocado oil, extra-virgin olive oil, and olives weekly. Use olive oil for low-heat cooking and coconut oil for baking and high-heat cooking. Avoid canola oil.
- Polyunsaturated fats: Eat foods rich in omega-3, such as walnuts, ground flaxseed, wild salmon, mackerel, and sardines, at least three times a week. Omega-3 from food sources is far better absorbed than from taking supplements.
- MCT oils: Take organic extra-virgin coconut oil, from 1 to 4 tablespoons each day. Ramp up slowly from 1 tablespoon once a day to 2 tablespoons twice a day, over a couple of weeks.

Reduce **bad fats**, which include saturated fats and trans-fats, as well as seed oils.

- Saturated fats: Where possible, avoid high-fat dairy items (such as whole milk or whole-fat cheese). Consume animal proteins no more than twice a week. Keep serving sizes palm-sized. If eating beef, focus on grass-fed organic beef. Poultry should be pastured. Fish should be fresh-caught or wild, not farmed. Minimize processed, pre-packaged foods.
- Trans fats: Avoid foods that contain hydrogenated or partially-hydrogenated oils (like shortening and stick margarine), and decline fried foods. Read the ingredient list in packaged food (verify labels stating “0g trans-fat per serving”).
- Seed oils, which are heated (as opposed to being cold-pressed as olive oil is), have lost much of their vitamin E due to the heating process, making them synaptic-damaging agents. Avoid heat-processed oils altogether.

Good sources of **soluble fiber** include: apples, blueberries, carrots, celery, cucumbers, dried peas, chia seeds, flaxseeds, lentils and other beans, nuts, oat bran, oat cereal and oatmeal, oranges, pears, psyllium, and strawberries.

Foods with low-glycemic load have the positive effect of reducing the spike of rapidly-changing insulin levels. So, focus on avoiding food with high glycemic load. Avoid foods and drinks with white sugar, white flour, or high-fructose corn syrup — as well as honey, maple syrup, and molasses. Cut out sugar candies, sweets, and sugary soda. Stick with fist-sized portion sizes (or a half-cup when cut up) of fruits and carbohydrate-rich foods like white rice, white potatoes, corn, and green peas. Aim to keep each food item to a glycemic load of 10 or lower, with a total daily load under 100.

Among **vegetables and fruits**, focus on fresh or frozen (plain, without seasoning). Eat three servings of fresh fruit and three-to-five servings of fresh vegetables daily. Over every three days, consume fruits and vegetables from all colors of the rainbow. Limit fruits to one serving per meal or snack, and avoid commercial fruit juices. Rather than making homemade fruit juices, stick with smoothies and include whole fruit, to avoid the high glycemic load of pure juice. The EWG organization maintains two lists titled the Dirty Dozen and the Clean Fifteen. Fruits and vegetables in the Dirty Dozen list should be always purchased in organic form; foods in the Clean Fifteen need not be organic. <https://www.ewg.org/foodnews/summary.php>

Lean protein can improve satiety and blood sugar regulation, and should be part of each meal and snack. Additionally, one’s ability to build muscle mass deteriorates as they age, so protein requirements increase even as intake and appetite may wane. Supplementing with protein powder can increase lean body mass and muscle. Mix 20 to 30 grams of protein powder into a daily shake. Consume beans as an alternative protein source weekly. Good dietary sources of lean protein include: grass-fed organic beef or bison, low-fat dairy products, eggs, fish (free of mercury), nuts, organic poultry, seeds, soy products (such as tofu and tempeh), and beans and legumes.

Prebiotics and probiotics: help maintain a healthy immune system and digestive health. While food sources are the preferred choice, recommendations for high-quality probiotic supplementation are *Lactobacillus acidophilus* and *Bifidobacterium lactis* at a dose of 4 to 8 billion colonies, one to three times a day. Among probiotic food sources, consider: live cultures in dairy products (such as plain yogurt, buttermilk, & kefir), tempeh, miso soup, natto, kimchi, and freshly-made pickles or sauerkraut. Prebiotics are non-digestible fiber compounds in foods that promote the growth and activity of beneficial

microorganisms in the gut. Good probiotic sources include: asparagus, bananas, flaxseeds, garlic, jicama, leafy greens, leeks, legumes, and onions. Discuss specific recommendations with a dietitian.

Epidemiologic studies have identified coffee and green tea as protective against cognitive impairment, as well as having antioxidant properties. Without sufficient genomic information, the propensity toward caffeine metabolism is unknown. So, drink no more than two cups of coffee each day (200mg of caffeine) and finish them by noon. Although there is caffeine in green tea, it contains less caffeine than black tea, and in turn black tea has less caffeine than coffee. Avoid using coffee as a way to introduce hidden sugar into your daily intake.

MISSING AND OUTDATED INFORMATION

For Coaches to obtain:

Category	Details	Last Obtained On
Genome	Obtain a genome raw data file, from 23andMe or Genos Research.	
Vital Signs	Obtain missing circumference measurements of neck, waist, & hips.	
Medical History	Obtain details of immunizations.	
Cognitive Assessments	Obtain recent, dated AQ-21 and MoCA cognitive assessments.	
	Obtain the data from all online evaluations by CNS Vital Signs.	
	Complete the SF-36 health survey.	
	Refresh these findings every 6 months.	
Demographics	Obtain details about Age of menopause.	
Diet	Obtain details about Meat Consumption, Seed Oil Use, Simple Carbohydrates, Sweets, Coffee, and Tea.	
Hygiene	Obtain details about Dental; Hand, Feet, and Skin, and Nasal.	
Sleep	Obtain details about Drowsy, Restful, and Fall Asleep Midday.	
	Do you often feel Tired, Fatigued, or Sleepy during the daytime (such as falling asleep during driving or talking to someone)?	
Stress	Obtain details about Level.	

TEST FINDINGS

Cognitive Test	Recent Results	Interpretation
SAGE	6/06/2018 16.0 Low	SAGE is a cognitive test, with scores ranging from 22 (optimal) to 0 (min). Those with this score on the Self-administered Gerocognitive Examination (SAGE) are likely to have <i>mild memory or thinking impairments</i> . Further evaluation by a neurologist is recommended.

Lab Test	Recent Results	Interpretation
Homocysteine (nonfasting)	6/06/2018 12.8 µmol/L High	High homocysteine levels are associated with atrophy of the hippocampus, a key brain area for memory. High homocysteine levels can also facilitate a buildup of beta-amyloid and tau.

Lab Test	Recent Results	Interpretation
Vitamin B12 (cobalamins) (nonfasting)	6/06/2018 398.0 pg/mL Low	Vitamin B12 shortage is linked to increased myelin degradation, brain cell atrophy, increased inflammation, and high homocysteine levels. All of these contribute to memory problems and most are risk factors for Alzheimer's disease.
hs-CRP (high sensitivity C-reactive protein)	6/06/2018 47.7 mg/L Very high	This level of hs-CRP is far above target, an indicator of inflammation. Inflammation plays a critical role in exacerbating aging and Alzheimer's disease, with multiple biological mechanisms involved. Further evaluation by a physician is recommended.
A/G ratio	6/06/2018 1.3 Very low	A marker of inflammation status is the A/G ratio (the ratio of albumin to globulin). This A/G ratio is far below target, indicating a concern for inflammation or bacterial infection. Inflammation plays a critical role in exacerbating aging and Alzheimer's disease, with multiple biological mechanisms involved. Periodontal disease is often associated with decreased A/G levels. These levels could indicate the severity of periodontal destruction. Further evaluation by a physician is recommended.
Albumin	6/06/2018 4.1 g/dL suboptimal	This albumin level is below optimum. Albumin is a blood plasma protein synthesized in the liver. It is the single most abundant protein in plasma and constitutes about two-thirds of total protein content. There are many causes of low albumin levels, including poor nutritional state or increased excretion of albumin from your body from kidney dysfunction. The kidneys may be leaking albumin in the urine. Other causes include hepatitis, congestive heart failure, pericarditis, inflammatory bowel disease, lymphoma, or infections such as tuberculosis.
Vitamin B9 (Folate, folic acid)	6/06/2018 26.9 ng/mL Very high	This level of folate (also known as folic acid or vitamin B9) is far above target. (People who have Alzheimer's disease often have low levels of folic acid in their blood.) Further evaluation by a physician is recommended.
Vitamin D (25-hydroxy)	6/06/2018 42.3 ng/mL suboptimal	Low vitamin D is associated with increased risk for dementia, and low vitamin D levels are common in those with Alzheimer's disease. Once activated by the liver and kidneys, it circulates as a hormone, much like thyroid hormone, and binds to its own receptor (vitamin D receptor), which then binds to DNA and turns on over 100 genes. Vitamin D affects bone metabolism, helps to suppress cancer formation, reduces inflammation, appears to inhibit the development of Alzheimer's disease, affects cardiovascular disease, and has many other effects.
Vitamin E (alpha tocopherol)	6/06/2018 17.6 mg/L	Vitamin E is neuroprotective against beta-amyloid-associated free radical toxicity. The neuroprotective effect of vitamin E seems to be related to the combination of different forms, rather than to alpha-tocopherol alone.
Hemoglobin A1c	6/06/2018 5.8% High	Hemoglobin A1c is a test that shows the average level of blood sugar over the past 2 to 3 months. Specifically, the A1c test measures what percentage of hemoglobin, a protein in red blood cells that carries oxygen, is coated with sugar (glycated). The higher the A1c level, the poorer the blood sugar control and the higher the risk of diabetes complications.
Glucose (nonfasting)	6/06/2018 91.0 mg/dL	Nonfasting glucose levels can range from somewhat higher to significantly higher, depending on the time and type of the previous meal. Poor control over glucose levels can lead to a pre-diabetic state. Insulin resistance can lead to brain inflammation, amyloid plaques, and tau tangles.
Total cholesterol (nonfasting)	6/06/2018 188.0 mg/dL	This value for total cholesterol is within an acceptable target range, not likely to be leading to vascular disease.
Triglycerides (nonfasting)	6/06/2018 127.0 mg/dL	Triglycerides are a chief form of stored fats and a major source of energy. Your body needs these fats within normal ranges to provide energy. High triglyceride levels increase the risk for all causes of dementia, and are one of the core components of metabolic syndrome.
HDL cholesterol	6/06/2018 61.0 mg/dL	This HDL level is on target; values in this range are associated with lowered risk of Alzheimer's disease.
LDL cholesterol (nonfasting)	6/06/2018 102.0 mg/dL	Low LDL levels are desirable. High LDL cholesterol levels are linked to increased likelihood of developing beta-amyloid plaques, an indicator of Alzheimer's disease. Additionally, high LDL can lead to atherosclerosis.

Lab Test	Recent Results	Interpretation
LDL/HDL ratio calc. (nonfasting)	6/06/2018 1.7	High LDL can lead to atherosclerosis. Higher HDL can be neuroprotective.
Total/HDL ratio calc. (nonfasting)	6/06/2018 3.1	When comparing total cholesterol to HDL, the smaller the ratio, the better. Reports from the <i>Framingham Heart Study</i> suggest that for men, a total cholesterol-to-HDL ratio of 5 signifies average risk for heart disease; 3.4, about half the average risk; and 9.6, about double the average risk. Women tend to have higher HDL levels, so for them, a ratio of 4.4 signifies average risk; 3.3 is about half the average; and 7, about double.
Triglycerides/HDL ratio calc. (nonfasting)	6/06/2018 2.1	High triglyceride levels increase the risk for all causes of dementia, and are one of the core components of metabolic syndrome. High HDL levels may have a neuroprotective effect. The desired relationship between these is a low ratio.
TSH (Thyroid Stimulating Hormone)	6/06/2018 1.9 μ IU/mL	High TSH values are concerning for some degree of hypothyroidism. Hormone balance is important for synaptic balance and cognitive optimization. The generally-accepted normal levels for TSH are too inclusive; high values should be addressed aggressively. Hormone levels should be normalized, which will require appropriate follow-up for any potential hormone side effects.
AM Cortisol	6/06/2018 10.9 μ g/dL	While stress is a complex physiological and metabolic concept, studies indicate that individuals exposed to stress, or who show endocrine or metabolic concomitants of stress exposure, have poorer cognitive function in aging. Older individuals with higher levels of plasma glucocorticoids show smaller hippocampal volumes than those with lower levels. Studies indicate deleterious effects associated with higher levels of glucocorticoids, including hippocampal atrophy, dendritic atrophy, reduced neurogenesis, and changes in LTP.
DHEA-s	6/06/2018 50.0 μ g/dL	DHEA-s (dehydroepiandrosterone-sulfate) is a steroid hormone produced mainly by the adrenal cortex. Though it is an androgen (a male-type sex hormone), it is produced by both males and females. DHEA-s serves as a building block for making the male sex hormone testosterone and the female sex hormone estrogen. Low DHEA-s levels are associated with the onset of Alzheimer's disease.
Estradiol	6/06/2018 8.1 pg/mL	Estradiol levels are often found to be low in women with Alzheimer's disease. Hormone balance is important for synaptic balance and cognitive optimization. Furthermore, the reduction in estrogen in mid-life and beyond are temporally associated with reductions in cognitive optima.
Progesterone	6/06/2018 0.04 ng/mL Low	Progesterone has been shown to be neuroprotective, by attenuating beta-amyloid induced neuronal toxicity by inhibiting the mitochondrial-associated apoptotic pathway.
Total Testosterone	6/06/2018 2.2 ng/dL Very low	Hormone balance is important for synaptic balance and cognitive optimization. Furthermore, the reduction in testosterone in mid-life and beyond are temporally associated with reductions in cognitive optima. The generally-accepted normal levels for total testosterone are too inclusive; this low value should be addressed aggressively. Hormone levels should be normalized, which requires appropriate follow-up for any potential hormone side effects.
Copper, RBC	6/06/2018 110.0 μ g/dL High	High copper is linked to Alzheimer's disease, lower cognitive abilities, and cognitive loss.
Zinc, RBC	6/06/2018 101.0 μ g/mL Very high	Zinc has been shown to be neuroprotective and to lower free copper levels. It is essential for the healthy functioning of the brain. However, this high zinc level can indicate other medical conditions, so a physician's attention is recommended. It is thought that zinc plays a key role within the brain of reducing inflammation. Inflammation in the brain is often seen in people with Alzheimer's disease, and may directly impact on the progression of the disease.
Iron (nonfasting)	6/06/2018 52.0 μ g/dL	Excess iron generates oxidative stress. Alzheimer's disease patients often are found to have high levels of iron in the brain.
Ferritin	6/06/2018 383.0 ng/mL High	Expression of mitochondrial ferritin is increased by pro-inflammatory cytokines. Overexpression of this protein leads to decreased beta-amyloid production in the cell.
Magnesium, RBC	6/06/2018 4.5 mg/dL Low	Elevation of brain magnesium helps prevent synaptic loss and can reverse cognitive deficits in Alzheimer's disease. This low magnesium level can also lead to reduced sleep or irregular sleep patterns.

Lab Test	Recent Results	Interpretation
Selenium	6/06/2018 136.0 µg/L	Selenium helps combat oxidative stress produced by accumulation of aluminum chloride in the brain. It can also be helpful in preventing the onset of Alzheimer's disease.
Calcium (nonfasting)	6/06/2018 9.5 mg/dL Low	This calcium level is low, and could be an indicator of hypocalcemia.
BUN	6/06/2018 14.0 mg/dL	Blood urea nitrogen (BUN) is part of the screening of kidney function, related to memory loss. Poor kidney function can lead to more waste products in the blood. It can produce disorientation, confusion and difficulty expressing simple thoughts.
Creatinine	6/06/2018 1.1 mg/dL	Creatinine is the breakdown product of creatine in the cell. Cytosolic brain-type creatine kinase is significantly inactivated by oxidation in Alzheimer's disease patients. Creatinine protects neurons against beta-amyloid toxicity and NMDA-receptor internalization, increases mental concentration, memory, and learning. It may also protect cells from apoptosis and activate mitochondrial respiration.
Uric Acid	6/06/2018 5.9 mg/dL	This level of uric acid is within normal range. Studies suggest that serum uric acid levels are significantly lower in Alzheimer's disease patients in comparison to control subjects. Uric acid may have a protective role against AD.

 **ASSESSMENTS**

Below is a summary of the participant's cognitive ability and functioning. Implement the care plan and review the suggested *Recommended Action* to work towards optimizing brain health.

Assessment Category	Assessment Tool(s)	Date	Score/Evaluation	Notes	Recommended Action
Cognitive Assessment	SAGE	6/06/2018	16.0	Mild memory or thinking impairments.	Further evaluation by a neurologist may be appropriate.
Neurocognition and Depression	PHQ-2	6/06/2018	Yes	Participant indicated either a loss of interest and/or is feeling down at that this time.	Further evaluation from a physician is needed.
Function	FAQ	6/06/2018	11	Potential impaired function and possible cognitive impairment.	Further assessment is needed.
Safety	Safety Assessment Checklist	6/06/2018	<ul style="list-style-type: none"> • Yes, to questions 2 and 3. • No, to questions 1, 4, 5, 6, and 7. 	There are concerns about safety in the home.	Further assessment is needed. Refer to: Safety Assessment Guide and Checklist
Medication	Self-report	6/06/2018	Provided	All known medications and supplements appear in the Current Medications section of the care plan.	Verify and review medications and supplements.

Notes:

1. Physician should review the care partner's knowledge, advanced care planning, assess the ability to make decisions of the person under care, and provide resources.
2. These assessments are for this care plan. Continued monitoring by medical staff is recommended for all assessment areas.
3. Stages of Cognitive Impairment are determined by using the cognitive assessment and the FAQ.
4. In addition to the actions for physician noted above, compliance to the care plan is recommended for optimizing brain health.

✓ **PHYSICIAN APPROVAL**

version 3.0.10122

Patient Name

This report lists a subset of the data used as input for analysis. The complete set of the data used as input is available on the uMETHOD portal at <https://portal.umethod.com/>.

This RestoreU METHOD created on 6/29/2018 has been reviewed and approved.

Signature: _____ Date: _____
Physician