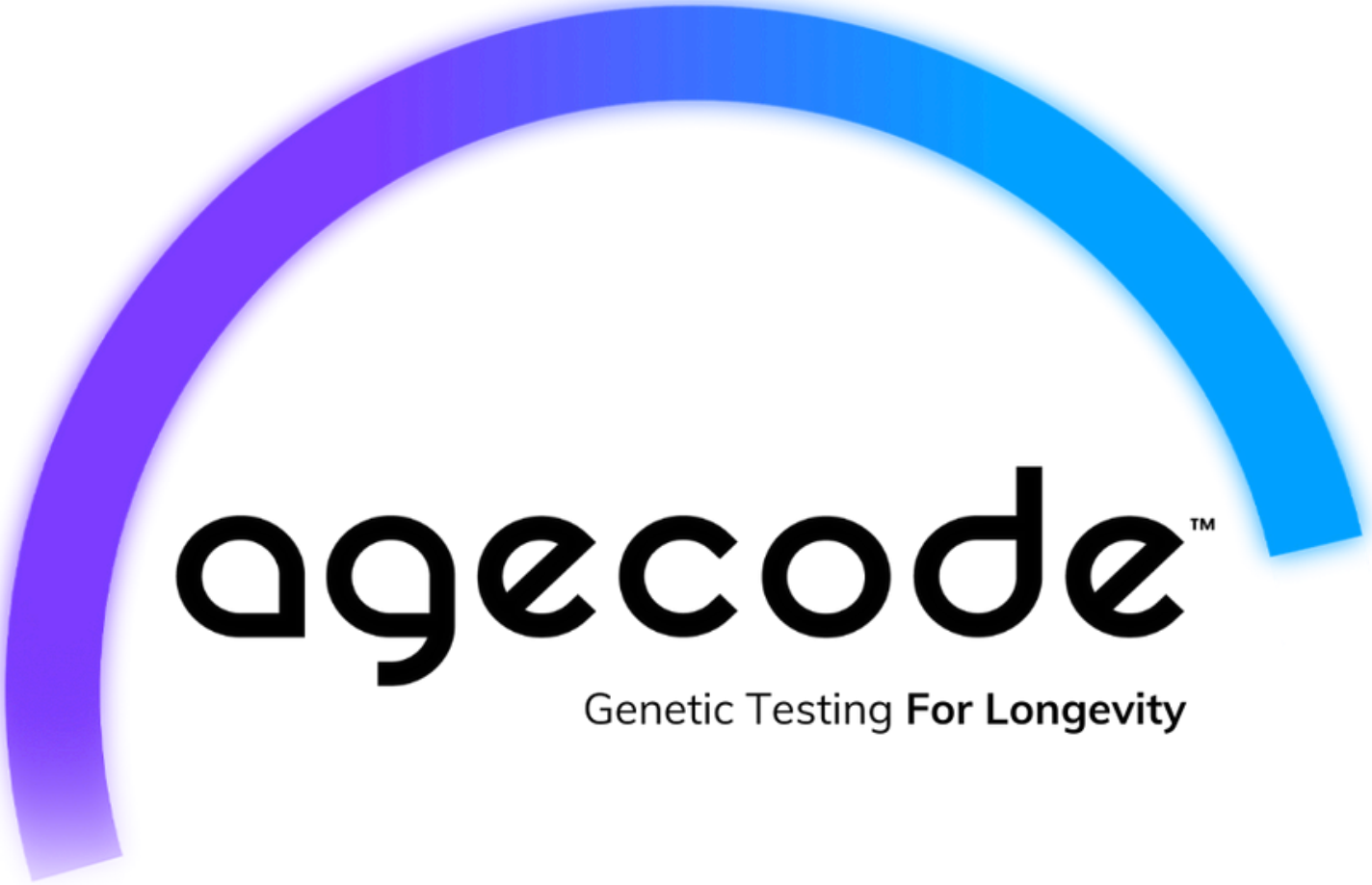
Genetic Biomarker Report



Kit Id: 3B4SHR3
Age: 33
Gender: Male
Date of Report: 4/25/2025

General **Disclaimer**

AgeCode is intended for informational and educational purposes only. It is not a diagnostic tool, and it is not intended to diagnose, treat, cure, or prevent any disease. You should not interpret the results as medical advice. Always consult a licensed healthcare professional before making any health decisions based on this report.

Baseline **Results**

YOUR AGE
Your current Chronological Age based on the year you were born

BIOLOGICAL
Your Biological Age based on your Overall Systems Age and Chronological Age

ORGAN SYSTEMS
Your Overall Organ Systems Age based on the population at the same calendar age as you

PACE OF AGING
Your Pace of Aging is based on how fast your body is aging internally compared to the average person your age

Understanding Your Health At **The Cellular Level**

This report gives you a deeper look at how your body is really aging, not just based on your birthday, but based on what's happening inside your cells. By utilizing advanced **Genetic Screening and Methylation Analysis** from a simple and easy to take blood sample, **AgeCode™ examines over 725,000 SNPs and 225,000 CpG sites, in addition to processing more than 1 Trillion data points** with cutting-edge **AI technology** delivering unparalleled insights.

Through **Methylation Analysis**, we analyze specific chemical markers on your **DNA**, known as epigenetic patterns. This helps assess your biological age, the health of your major organ systems, and how quickly or slowly your body is aging compared to others your age.

These insights go beyond traditional lab tests. **While most blood panels reflect short-term changes, epigenetic testing reveals long-term trends influenced by your lifestyle, environment, and health habits**. It paints a clearer picture of how your choices may be affecting your body's performance and aging process. With this information, you can identify areas of strength and potential concern, such as inflammation, immune function, and nutrient metabolism, and take meaningful steps to improve your health and longevity.

Note: Epigenetic patterns reflect longer-term biological trends, but they can shift over time in response to changes in lifestyle, behavior, and environment. These results should be interpreted as part of an ongoing wellness journey. Follow-up testing is encouraged to monitor progress over time.

Recommendations

livingene™ Nutraceuticals

You've just unlocked a comprehensive view of your body's biological blueprint, this isn't just information; it's an opportunity to take action.

With these insights, you now have the power to optimize your biomarkers, slow your pace of aging, and enhance your healthspan. **Support your cellular health with LivinGene Nutraceuticals:**

Cell Detox – **(RECOMMENDED)** The essential first step to vibrant health, Cell Detox sweeps your body clean of toxins, heavy metals, spike proteins, and parasites, clearing the way for deeper healing and lasting energy.

Cell Repair – **(RECOMMENDED)** Activate your body's natural fountain of youth, Cell Repair unleashes stem cell renewal to rebuild, rejuvenate, and reverse the signs of aging from deep within.

Cell Shield – **(RECOMMENDED)** Your ultimate armor for longevity, Cell Shield fortifies your cells, heart, brain, and blood vessels with powerful anti-inflammatory protection and membrane repair.

Cell Biome – **(RECOMMENDED)** Designed for both short-term recovery and long-term maintenance, Cell Biome is ideal for post-cleanse, post-antibiotic, or sensitive gut users seeking comprehensive intestinal resilience and repair.

Cell Renewal – **(RECOMMENDED)** Turn back the biological clock, Cell Renewal charges your mitochondria with NAD+, PQQ, and CoQ10, igniting pure cellular energy and unlocking the code to longer, stronger living.

Cell Defense – **(RECOMMENDED)** Empower your immune army, Cell Defense strengthens your natural killer cells and shields you from chronic disease with elite botanical defenders like reishi and astragalus.

IMUN Immune Cell Banking

Congratulations, you qualify to bank your Immune Cells today with IMUN! (RECOMMENDED)

Preserving your blood today is an investment in your future health, ensuring access to potentially lifesaving treatments and cutting-edge personalized therapies when you need them most.

Biological Age **Clock**

Here's one of the first things we're looking at: how your body is aging biologically, and what that means for your future health. We do this by looking at what's happening at the cellular level, not just the number on your birthday. It uses a combination of DNA-based markers, metabolic data, and other signals in your blood to estimate your Biological Age, a reflection of how well your body is functioning compared to others your age.

You'll also see how your biological age affects your potential risk for certain health issues, like heart disease or diabetes. These risk scores are statistical estimates that help you spot areas where your cellular aging may be impacting your long-term health.

To explain, these insights are powered by advanced epigenetic models that have been trained on large-scale health datasets, allowing us to compare your methylation patterns against people with known biological outcomes. Based on how your results compare to others in your cohort, you'll be placed into one of three categories: **Optimal, Moderate or At Risk**.

The risk estimates provided are statistical in nature and are not a substitute for clinical evaluation. They do not represent a diagnosis or medical opinion.

Moderate

Biological Age: Your Biological Age is 33.03 years.

Optimal

Chronic Obstructive Pulmonary Disease: At your Biological Age of 33.03, you have a 27.46% lower risk of COPD compared to people of your same Chronological Age.

Optimal

Heart Disease: At your Biological Age of 33.03, you have a 69.16% lower risk of developing a heart disease compared to people of your same Chronological Age.

Optimal

Depression: At your Biological Age of 33.03, you have a 27.46% lower risk of developing depression compared to people of your same Chronological Age.

Optimal

Type 2 Diabetes: At your Biological Age of 33.03, you have a 59.11% lower risk of Type 2 Diabetes compared to people of your same Chronological Age.

Optimal

Stroke: At your Biological Age of 33.03, you have a 55.74% lower risk of stroke compared to people of your same Chronological Age.

Optimal

Cancer: At your Biological Age of 33.03, you have a 37.92% lower risk of developing cancer compared to people of your same Chronological Age.

Optimal

Death: At your Biological Age of 33.03, you have a 20.13% lower risk of death compared to people of your same Chronological Age.

Understanding Your Results: **Organ Systems Age**

Now that we've looked at your overall Biological Age, let's take a closer look at how your body's core systems are functioning on a cellular level.

Your Organ Systems Age is based on a set of biological markers that represent the health and activity of your body's major systems, such as metabolic, immune, musculoskeletal, and beyond. These markers are analyzed through your DNA methylation patterns, then compared against a large reference population to estimate how your systems are aging relative to your chronological age. Each system is assigned a normalized score that reflects whether it is aging optimally, moderately, or at risk.

- A score of 0.98 or lower reflects **Optimal** aging—your systems are likely aging more slowly than expected for your age.
- A score between 0.99 and 1.02 is considered **Moderate**, meaning aging is roughly on pace.
- A score of 1.03 or higher is considered **At Risk**, indicating accelerated aging of that system compared to others your age.

By identifying which systems are performing well and which may need more support, this analysis helps guide personalized recommendations to improve your healthspan and longevity.

Example Results:

In this example illustrating **Metabolic Ages**, consider three individuals:

- A 30 year old with a Metabolic Age Score of 29
- A 40 year old with a Metabolic Age Score of 41
- A 50 year old with a Metabolic Age Score of 54

Their results would be categorized accordingly based on their percentile rankings, providing a clear representation of their Metabolic Systems Age in relation to established reference ranges.

Organ Systems Age **Overview**

Again, you'll see the estimated biological age of each organ system, along with how quickly it's aging compared to your chronological age. Refresher, your chronological age is based on the year you were born. These insights are not diagnostic and should be interpreted as part of an overall wellness picture.

Optimal

Musculoskeletal Age: Your Musculoskeletal Age is 28.30. Your Musculoskeletal System's pace of aging is 0.86 times your chronological age.

Optimal

Liver Age: Your Liver Age is 30.14. Your Liver's pace of aging is 0.91 times your chronological age.

At Risk

Kidney Age: Your Kidney Age is 35.55. Your Kidney's pace of aging is 1.08 times your chronological age.

Optimal

Lung Age: Your Lung Age is 26.60. Your Lung's pace of aging is 0.81 times your chronological age.

Optimal

Heart Age: Your Heart Age is 25.30. Your Heart's pace of aging is 0.77 times your chronological age.

Optimal

Brain Age: Your Brain Age is 26.60. Your Brain's pace of aging is 0.81 times your chronological age.

Optimal

Inflammation Age: Your Inflammation Age is 32.23. Your Inflammation System's pace of aging is 0.98 times your chronological age.

Optimal

Metabolic Age: Your Metabolic Age is 29.79. Your Metabolic System's pace of aging is 0.90 times your chronological age.

Optimal

Hormone Age: Your Hormone Age is 31.88. Your Hormone Sytem's pace of aging is 0.97 times your chronological age.

Optimal

Immune Age: Your Immune Age is 32.49. Your Immune System's pace of aging is 0.98 times your chronological age.

Optimal

Overall Systems Age: Your Overall Systems Age is 27.10. Your Overall System's pace of aging is 0.82 times your chronological age.

Understanding Your Results: **Micronutrients & Epigenetic Biomarkers**

Your **Epigenetic Biomarkers** are presented as normalized percentile scores, allowing for a precise comparison against a reference population. From this point onward, health metrics will vary across sections based on individual scores, either **Critical (Low), Deficient, Optimal, Elevated and Critical (High)**, moving away from a “one-size-fits-all” approach to provide unique percentile rankings for each micronutrient or epigenetic biomarker. The **"Critical"** classification signifies a micronutrient level that is either excessively high or dangerously low, requiring immediate attention. The **"Deficient"** category denotes a suboptimal level that falls below the **"Optimal"** range but has not yet reached the severity of the **"Critical (Low)"** threshold. The **"Elevated"** category denotes a level that exceeds the **"Optimal"** range but has not yet reached the severity of the **"Critical (High)"** threshold. By contextualizing your results within a rigorously studied cohort, this analysis helps pinpoint areas requiring targeted interventions empowering you to make informed decisions for optimized health.

Biomarker data is presented as part of a wellness and longevity profile. Results are based on DNA methylation signatures and population-based algorithms. These are subject to limitations inherent in epigenetic modeling and should be interpreted in the context of broader clinical assessments. The interpretation of any biomarker value should be performed by a qualified healthcare provider.

Example Results:

In this example illustrating **Omega-6** levels, consider five individuals with varying **Omega-6 Scores: 5, 20, 60, 80 and 95**. Their results would be categorized accordingly based on their percentile rankings, providing a clear representation of their micronutrient status in relation to established reference ranges.

Key Nutrient **Insights**

Key Nutrient Insights evaluates how your body interacts with and processes the nutrients in your diet. This detailed analysis identifies potential deficiencies or excesses in essential vitamins and minerals, providing a comprehensive understanding of your nutritional needs. With this information, you can make informed adjustments to your dietary habits, fostering a more balanced and proactive approach to your overall health.

Elevated

Alpha-Ketoglutarate (AKG) is a key molecule in the Krebs cycle, playing an essential role in energy production, amino acid metabolism, and overall cellular function. Elevated AKG signals mitochondrial congestion (slowdown in the energy cycle), incomplete oxidation of fuels (glucose, fats, amino acids), oxidative stress slowing enzyme function, high protein or amino acid breakdown (especially glutamate) and over-supplementation (if taking AKG supplements).

- In short:
  - **Too much AKG = energy cycle backup + oxidative stress burden.**
- **1. Support Complete Mitochondrial Energy Cycle**
  - Elevated AKG often means a **Krebs cycle slowdown** — energy is *unfinished*. Mitochondrial "unclogging"
  - nutrients:
    - **CoQ10 (ubiquinol)** – drives electron transport
    - **Magnesium** – critical for ATP production
    - **B2 (riboflavin)** and **B3 (niacin/NAD+)** – electron carriers
    - **L-carnitine** – helps shuttle fats into mitochondria
    - **Alpha-lipoic acid (ALA)** – supports enzyme regeneration
- **2. Lower Oxidative Stress**
  - Oxidative damage slows the Krebs cycle and blocks AKG utilization.
    - Key antioxidants:
      - **Glutathione** or **NAC** (core antioxidant defense)
      - **AstaxanthinDelta Tocotrienolsvitamin Cresveratrol**
      - **Green tea extract (EGCG)** – mitochondrial anti-inflammatory
- **3. Optimize Amino Acid Metabolism**
  - AKG is tightly connected to **glutamate and glutamine metabolism**.
    - Excess glutamate excess AKG.
  - Amino acid balance:
    - Take **LivinGene Cell Detox**
    - Moderate total protein intake (not too high)
    - **Glycine** supplementation (balances glutamate)
    - **Taurine** – calms excitotoxic amino acid activity
    - Support liver detox (helps clear excess nitrogen/ammonia)
- **4. Enhance NAD+ Levels and Sirtuin Activation**
  - NAD+ is essential to keep the energy cycle flowing downstream from AKG.
    - Boost NAD+ naturally:
      - **Intermittent fasting** (14–16 hr windows)
      - **Exercise** (especially strength + cardio)
      - **Polyphenols** (resveratrol, pterostilbene, quercetin)
      - **Spermidine-rich foods** (natto, wheat germ)
- **5. Prioritize Sleep for Mitochondrial Reset**
  - Mitochondrial repair and AKG utilization happen during deep sleep.
    - Sleep optimization:
      - Dark, cool room (65–68°F)
      - Sleep before 10:30 PM
      - Use **magnesium glycinateglycinetheanine** if needed
- **6. Lower Stress and Cortisol**
  - High cortisol disrupts mitochondrial metabolism and amino acid balance.
    - Parasympathetic activation:
      - Breathwork, yoga, tai chi, grounding
      - Adaptogens: **ashwagandharhodiolaholy basil**
      - Morning sunlight + minimal blue light at night
- **7. Optimize Diet for Mitochondrial Flexibility**
  - Diet can either feed or clog the Krebs cycle.
    - Focus on:
      - **Low-glycemic, anti-inflammatory diet** Moderate
      - protein (0.8–1.0 g/kg ideal body weight) Healthy fats:
      - olive oil, avocado, wild salmon Plenty of non-starchy
      - vegetables (fiber, micronutrients)
- **Optional Deeper Testing:**
  - If AKG remains elevated:
    - **Organic Acids Test (OAT)** – full mitochondrial health map
    - **Homocysteine,glutamate glutamine** levels
    - **NAD+ testing** (intracellular)
    - **Oxidative stress panels** (8-OHdG, lipid peroxides)
- **Summary Protocol for Elevated Alpha-Ketoglutarate:**
  - **Take LivinGene Cell Detox and Cell Renewal**
  - Unclog the energy cycle with CoQ10, magnesium, B2, B3, carnitine, and ALA

- Lower oxidative stress with glutathione, astaxanthin, Delta-Tocotrienols, vitamin C, and resveratrol
- Balance amino acids with glycine and taurine if needed
- Boost NAD+ levels and sirtuin activation through fasting, exercise, and polyphenols
- Prioritize deep restorative sleep for mitochondrial recovery
- Lower cortisol and activate the parasympathetic nervous system daily
- Optimize diet with low-glycemic foods, moderate protein, healthy fats, and fiber
- Test further if AKG stays high

Optimal

Betaine (TMG)

A methyl donor involved in liver function and cell hydration.

Deficient

Choline is an essential nutrient involved in brain development, liver function, and the production of neurotransmitters like acetylcholine. To naturally increase choline levels in the body, here are some effective strategies:

1. **Eat Choline-Rich Foods**
   - Incorporate these foods into your diet:
     - **Animal-Based Sources (Highest in Choline)**:
       - **Organic Eggs**: Especially the yolks, which are one of the richest sources of choline.
       - **Organic Liver**: Beef liver and chicken liver are extremely high in choline.
       - **Wild Fish**: Cod, salmon, and other fatty fish.
       - **Organic Meat**: Beef, turkey, and chicken.
     - **Plant-Based Sources**:
       - **Organic Soy Products**: Tofu, soybeans, and soy milk.
       - **Legumes**: Chickpeas, lentils, and kidney beans.
       - **Cruciferous Vegetables**: Broccoli, cauliflower, and Brussels sprouts.
       - **Nuts and Seeds**: Sunflower seeds, flaxseeds, and almonds.
       - **Whole Grains**: Quinoa, oats, and wheat germ.
2. **Support Gut Health**
   - Gut bacteria may help synthesize small amounts of choline. To enhance gut health:
     - **Eat prebiotic foods:** Garlic, onions, bananas, asparagus.
     - **Incorporate probiotics:** Yogurt, kefir, sauerkraut, kimchi.
3. **Limit Alcohol Consumption**
   - Excessive alcohol intake can reduce choline levels and impair liver function. Moderating alcohol helps maintain optimal choline levels.
4. **Consider Choline-Rich Supplements (If Necessary)**
   -
     - **Lecithin**: Found in soy or sunflower products.
     - **Alpha-GPC or Citicoline**: These are bioavailable forms of choline often used for brain health.
5. **Pair with Nutrients That Support Choline Function**
   - Choline works synergistically with other nutrients:
     - **Folate (Vitamin B9)**: Helps in methylation pathways with choline. Found in leafy greens, avocados, and fortified cereals.
     - **Vitamin B12 and B6**: Support choline metabolism. Found in meat, fish, and dairy.
     - **Omega-3 Fatty Acids**: Found in fatty fish, chia seeds, and flaxseeds. They complement choline's role in brain health. Consider taking our Cell Shield supplement.
6. **Stay Hydrated**
   - Proper hydration ensures that metabolic processes, including those involving choline, function optimally.

Optimal

Spermidine Spermidine is a polyamine compound involved in cellular growth, proliferation, and apoptosis, known for its potential role in promoting autophagy and longevity, and is found in foods like aged cheese, soy products, and whole grains.

Optimal

Vitamin A Retinol (Vitamin A) is essential for vision, immune function, and cellular communication.

Optimal

Vitamin B3 Nicotinamide is a form of vitamin B3, essential for NAD+ production and cellular energy. Low levels are associated with lower NAD+ production, and high levels are associated with inhibition of Sirtuins and NAD+ recycling pathways.

Optimal

Vitamin B5 Pantothenic Acid (Vitamin B5) is essential for CoA synthesis and energy metabolism.

Optimal

Vitamin B6 Pyridoxine (Vitamin B6) is a coenzyme in amino acid metabolism and neurotransmitter synthesis.

Optimal

Vitamin B8
Inositol (Vitamin B8) is a carbohydrate involved in cell membrane formation and insulin signal transduction.

Optimal

Vitamin D Cholecalciferol is a form of Vitamin D, important for bone health and immune function.

Optimal

Vitamin E
Alpha-tocopherol is a form of Vitamin E with strong antioxidant properties. High levels can be associated with reduced gamma-tocopherol function, and low levels can be associated with poor antioxidant function.

Protein Metabolite **Profile**

Your Protein Metabolite Profile shows how your body is using important building blocks like amino acids. These nutrients play key roles in energy, brain function, and muscle health. With this information, you can make informed adjustments to your dietary habits, fostering a more balanced and proactive approach to your overall health.

Deficient

Arginine (L-Arginine) is a semi-essential amino acid that plays a key role in protein synthesis, immune function, and the production of nitric oxide, which supports healthy blood flow and cardiovascular health. While your body can produce arginine, increasing it through diet can optimize its benefits. Here's how to naturally boost arginine levels:

- **1. Eat Arginine-Rich Foods**
  - The best sources of arginine are protein-rich foods. Incorporate these into your diet:
    - **Animal-Based Sources:**
      - **Organic Meat**: Beef, pork, and lamb; poultry, especially turkey and chicken breast
      - **Wild Fish and Seafood**: Salmon, tuna, mackerel, and shellfish (e.g., shrimp, crab, and lobster)
      - **Organic Dairy**: Milk, yogurt, and cheese
      - **Organic Eggs**: A good source of high-quality protein and arginine.
    - **Plant-Based Sources:**
      - **Nuts and Seeds**: Pumpkin seeds, sesame seeds, sunflower seeds, almonds, walnuts, and peanuts
      - **Legumes**: Lentils, chickpeas, soybeans, and black beans
      - **Whole Grains**: Quinoa, oats, and whole wheat
      - **Vegetables**: Spinach, kale, broccoli, and seaweed (spirulina)
- **2. Include Foods That Support Arginine Metabolism**
  - To maximize the benefits of arginine, pair it with nutrients that support nitric oxide production and protein synthesis:
    - **Vitamin C** (found in citrus fruits, bell peppers, and strawberries) enhances nitric oxide production
    - **Magnesium** (from nuts, seeds, and leafy greens) helps optimize enzyme activity involved in arginine metabolism
- **3. Focus on Protein-Rich Diets**
  - Since arginine is an amino acid, consuming high-quality proteins ensures a steady supply. If you're plant-based, combine legumes with whole grains (e.g., rice and beans) to ensure complete protein intake.
- **4. Support Gut Health**
  - Arginine is synthesized in small amounts in the body, particularly in the kidneys and liver. A healthy gut enhances the absorption of amino acids, including arginine. Promote gut health by:
    - Eating fermented foods (e.g., yogurt, kimchi, and sauerkraut)
    - Consuming prebiotic foods like garlic, onions, and bananas
- **5. Stay Active**
  - Exercise, particularly resistance training and cardiovascular workouts, stimulates nitric oxide production, which relies on arginine.
- **6. Limit Excessive Alcohol and Sugar**
  - Excessive alcohol and high-sugar diets can impair arginine metabolism and nitric oxide production. Focus on a balanced diet with whole foods.
- **7. Consider Natural Supplements (If Needed)**
  - If dietary sources are insufficient or specific health conditions require it, L-arginine supplements are available. These are often used for cardiovascular health, athletic performance, and wound healing. Always consult a healthcare provider before starting supplements.
- **8. Monitor for Signs of Deficiency**
  - While rare, arginine deficiency can result in poor wound healing, fatigue, and compromised immune function. If you suspect an issue, consult a healthcare professional.

Optimal

Asparagine An amino acid involved in metabolic processes.

Optimal

Citrulline Non-essential amino acid involved in nitric oxide production and vascular health.

Optimal

Cystathionine Intermediate in methionine metabolism and cysteine biosynthesis.

Optimal

Cysteine Amino acid involved in protein synthesis and antioxidant functions.

Deficient

Ergothioneine is a unique sulfur-containing antioxidant that supports cellular health, reduces oxidative stress, and protects against inflammation. While the body cannot synthesize ergothioneine, you can increase its levels by consuming foods that naturally contain it. Here's how to enhance ergothioneine levels naturally:

- **1. Consume Ergothioneine-Rich Foods**
  - Ergothioneine is concentrated in certain fungi and plant-based foods. Incorporate these into your diet:
    - **Mushrooms:** Mushrooms are the richest natural source of ergothioneine. The varieties with the highest levels include:
      - **King Oyster Mushrooms**
      - **Shiitake Mushrooms**
      - **Oyster Mushrooms**
      - **Maitake Mushrooms**
      - **Porcini Mushrooms White**
      - **Button Mushrooms**
    - **Other Plant-Based Sources:**
      - **Legumes**: Black beans, kidney beans, and lentils contain moderate amounts of ergothioneine.
      - **Whole Grains**: Oats, barley, and bran.
      - **Certain Vegetables**: Spinach, asparagus, and beets (though levels are lower than in mushrooms).
- **2. Support Gut Health**
  - Your body absorbs ergothioneine in the small intestine through a specific transporter protein (ETT, encoded by the *SLC22A4* gene). A healthy gut ensures efficient absorption. To support gut health:
    - Include **probiotic foods**: Yogurt, kefir, sauerkraut, kimchi.
    - Eat **prebiotics**: Garlic, onions, bananas, and asparagus.
    - Avoid excessive alcohol and processed foods.
- **3. Choose Ergothioneine-Rich Protein Sources**
  - Certain animal products can contain ergothioneine if the animals consumed ergothioneine-rich feed (e.g., fungi or grains). For example:
    - **Organic Organ Meats**: Liver and kidneys from grass-fed animals.
    - **Organic Eggs**: From free-range chickens fed a diverse diet.
    - **Wild Fish**: Small amounts may be present in fish like salmon and tuna.
- **4. Eat Fresh and Unprocessed Foods**
  - Ergothioneine levels in food are highest when the food is fresh. Avoid overprocessing or overcooking mushrooms and other ergothioneine-rich foods, as this can deplete their nutrient content.
- **5. Maintain a Balanced Diet**
  - A nutrient-dense diet supports overall antioxidant and sulfur metabolism, which complements ergothioneine's effects. Focus on:
    - **Sulfur-Rich Foods**: Garlic, onions, and cruciferous vegetables (e.g., broccoli, kale, Brussels sprouts).

- **Antioxidants**: Berries, citrus fruits, nuts, and seeds.
- **6. Stay Hydrated**
  - Proper hydration helps with nutrient absorption and distribution, including ergothioneine.
- **7. Avoid Toxins and Oxidative Stress**
  - Ergothioneine helps protect cells from damage caused by free radicals. To reduce oxidative stress:
    - Avoid smoking, excessive alcohol, and environmental toxins.
    - Practice stress management techniques such as meditation and regular exercise.
- **8. Monitor Vegetarian or Vegan Diets**
  - Mushrooms are an excellent plant-based source of ergothioneine, making them a key food for vegetarians and vegans. Combine them with legumes and grains to create balanced, nutrient-rich meals.
- **9. Supplementation (Optional)**
  - Ergothioneine supplements are available and are being studied for their potential health benefits. However, food sources are typically sufficient for most individuals. Consult a healthcare professional before using supplements.
- **Sample Meal Ideas to Boost Ergothioneine:**
  - **Mushroom Stir-Fry**: Use shiitake, oyster, and button mushrooms with garlic, spinach, and whole-grain rice.
  - **Lentil Mushroom Soup**: Combine lentils, king oyster mushrooms, carrots, and onions.
  - **Mushroom Omelet**: Add sautéed maitake mushrooms and spinach to your eggs.
  - **Roasted Mushrooms and Asparagus**: A simple side dish packed with ergothioneine.

Optimal

Glutamine An amino acid essential for gut health.

Optimal

Glycine An amino acid involved in detox and sleep.

Optimal

Histidine (N-acetylhistidine)

A derivative of histidine, important for metal ion binding and antioxidant functions. Low levels could affect muscle recovery, while high levels may indicate inflammation or stress.

Deficient

L-Aspartic Acid (Aspartate) is a non-essential amino acid, meaning your body can synthesize it on its own. However, consuming certain foods can help boost its levels, which may support energy production, hormone synthesis, and the urea cycle for detoxifying ammonia in the body. Here's how to naturally increase L-aspartic acid:

- **1. Eat Aspartic Acid-Rich Foods**
  - Incorporate foods that naturally contain high levels of L-aspartic acid into your diet:
    - **Animal-Based Sources (organic if possible)**:
      - **Meat**: Beef, pork, and lamb are excellent sources of aspartic acid.
      - **Poultry**: Chicken and turkey (especially dark meat).
      - **Fish**: Salmon, tuna, cod, and mackerel.
      - **Eggs**: Particularly egg whites, which are rich in aspartic acid.
      - **Dairy**: Milk, cheese, and yogurt.
    - **Plant-Based Sources**:
      - **Legumes**: Lentils, black beans, chickpeas, and soybeans (including tofu and edamame).
      - **Whole Grains**: Quinoa, oats, brown rice, and whole wheat products.
      - **Nuts and Seeds**: Almonds, sunflower seeds, pumpkin seeds, and walnuts.
      - **Vegetables**: Asparagus, spinach, broccoli, cauliflower, and mushrooms.

- **Fruits**: Oranges, apples, bananas, and avocados.

2. **Ensure Adequate Protein Intake**
   - Aspartic acid is present in most protein-rich foods. Consuming enough dietary protein ensures a steady supply of this amino acid.
   - Aim for **0.8–1.2 grams of protein per kilogram of body weight** for most adults, or higher if you're very active.
3. **Focus on Foods Containing Aspartate Salts**
   - Aspartate salts (e.g., magnesium aspartate, potassium aspartate) can enhance the absorption of minerals and naturally contribute to aspartic acid levels. These are often found in dietary supplements but can also be obtained from certain foods like:
     - **Nuts and Seeds**: Sunflower seeds and almonds.
     - **Dark Leafy Greens**: Spinach, kale, and Swiss chard.
4. **Support Aspartic Acid Production**
   - Aspartic acid can be synthesized from other amino acids, particularly **oxaloacetate**, through the body's metabolic processes. To support this:
     - Include **B-vitamin-rich foods**: B vitamins, especially B6, are essential cofactors in amino acid metabolism. Sources include bananas, chicken, fish, fortified cereals, and potatoes.
     - Eat foods rich in **oxaloacetate precursors** such as citric acid cycle intermediates (fruits like oranges, lemons, and grapefruit).
5. **Optimize Digestive Health**
   - Efficient digestion and absorption are key to obtaining aspartic acid from food:
     - **Consume Probiotic Foods**: Yogurt, kefir, sauerkraut, and kimchi can improve gut health.
     - **Chew Food Thoroughly**: Aids in protein digestion, which releases amino acids like aspartic acid.
     - **Papain** (from papaya) and **bromelain** (from pineapple) can enhance protein digestion.
6. **Include Fermented Foods**
   - Fermented foods are rich in free amino acids, including L-aspartic acid, due to the fermentation process. Examples include:
     - Miso, tempeh, kimchi, and fermented dairy products like kefir.
7. **Exercise Regularly**
   - Physical activity increases the body's demand for amino acids, which may enhance the synthesis and utilization of aspartic acid. Focus on:
     - Moderate aerobic exercise (e.g., jogging, swimming).
     - Strength training to promote protein turnover and amino acid demand.
8. **Avoid Excessive Alcohol and Processed Foods**
   - Alcohol and highly processed foods can interfere with protein metabolism and amino acid absorption. Focus on whole, nutrient-dense foods.

Sample Meal Ideas to Boost L-Aspartic Acid:

- **Grilled Chicken with Quinoa and Steamed Spinach**: A protein-packed meal with plant and animal sources of aspartic acid.
- **Lentil and Vegetable Stew**: Combine lentils with carrots, celery, and spinach for a hearty, nutrient-dense dish.
- **Salmon with Brown Rice and Broccoli**: Rich in protein and amino acids like aspartic acid.
- **Egg and Avocado Breakfast Bowl**: Combine boiled eggs with avocado, spinach, and whole-grain toast.
- **Tofu Stir-Fry with Mixed Vegetables**: A plant-based meal featuring soy (high in aspartic acid) and nutrient-dense veggies.

Supplementation (If Necessary)

- L-aspartic acid is available as a standalone supplement or in formulations like **D-aspartic acid** (DAA), commonly used to support energy and testosterone production. However, supplementation should only be considered under the guidance of a healthcare professional.

Optimal

Methionine

An essential amino acid involved in protein synthesis and detoxification processes.

Critical (Low)

S-Methylmethionine (SMM) also known as vitamin U, is a naturally occurring derivative of methionine. It is not classified as an essential nutrient, but it plays a beneficial role in gastrointestinal health, particularly in protecting and healing the lining of the stomach and intestines. You can naturally increase S-methylmethionine in your body by consuming foods that are naturally rich in it or that support its production. Here's how:

1. **Eat S-Methylmethionine-Rich Foods**
   - Certain foods naturally contain SMM, particularly plant-based foods. Incorporate these into your diet:
     - **Vegetables**:

- **Cabbage**: Both raw and fermented forms (e.g., sauerkraut) are excellent sources.
- **Broccoli**: High in SMM and other sulfur-containing compounds.
- **Brussels Sprouts**: Another cruciferous vegetable rich in SMM.
- **Kale and Spinach**: Leafy greens that contain SMM.
- **Asparagus**: Known for its sulfur-rich profile, which includes SMM.
- **Fruits**:
  - **Celery**: Contains SMM along with other beneficial compounds.
  - **Apples**: Especially the skin, which has various antioxidants and beneficial compounds.
- **Fermented Foods**:
  - **Sauerkraut**: Fermentation enhances SMM levels.
  - **Kimchi**: A fermented cabbage dish rich in SMM.

2. Consume Methionine-Rich Foods

Since S-methylmethionine is derived from methionine, increasing methionine intake can indirectly support SMM levels. Include these methionine-rich foods:

- **Animal-Based**: Eggs, fish, poultry, and dairy products.
- **Plant-Based**: Legumes, nuts, seeds, and whole grains.

3. Support Gut Health

A healthy gut microbiome may help optimize SMM levels by promoting the metabolism of methionine into its derivatives. To support gut health:

- **Probiotic Foods**: Yogurt, kefir, miso, and other fermented foods.
- **Prebiotic Foods**: Onions, garlic, leeks, and bananas.
- **Fiber-Rich Foods**: Fruits, vegetables, and whole grains to feed beneficial bacteria.

4. Eat Sulfur-Rich Foods

Sulfur is essential for methionine metabolism and the synthesis of SMM. Foods rich in sulfur include:

- **Allium Vegetables**: Garlic, onions, and leeks.
- **Cruciferous Vegetables**: Cabbage, broccoli, and Brussels sprouts.
- **Eggs**: Particularly rich in sulfur-containing compounds.

5. Limit Methionine Depletion

Avoid habits or factors that may reduce methionine levels, such as:

- **Excessive Alcohol Consumption**: Can impair liver function and amino acid metabolism.
- **High-Stress Levels**: Stress can deplete nutrients, including amino acids.

6. Consider Fresh Juices

Fresh juices made from SMM-rich vegetables like cabbage, celery, and spinach can provide a concentrated source of S-methylmethionine. Raw juices are particularly effective in delivering SMM to the digestive tract.

7. Avoid Overcooking Vegetables

Cooking, especially at high temperatures, may reduce the levels of SMM in vegetables. To preserve SMM:

- Use gentle cooking methods like steaming or blanching.
- Opt for raw or lightly cooked vegetables when possible.

8. Support General Protein Metabolism

The conversion of methionine to SMM requires a well-functioning metabolism. Ensure you're consuming:

- **B Vitamins**: Especially B6, B9 (folate), and B12, which are vital for amino acid metabolism.
  - Sources: Eggs, dairy, leafy greens, and fortified cereals.
- **Magnesium**: Found in nuts, seeds, and whole grains.

9. Stay Hydrated

Proper hydration supports all metabolic processes, including amino acid metabolism. Aim to drink enough water throughout the day, especially if you're consuming high-protein or high-sulfur foods.

Sample Meal Ideas to Boost SMM:

- **Raw Cabbage Salad with Lemon Dressing**: Combine shredded cabbage, carrots, and spinach for a refreshing and SMM-rich salad.
- **Steamed Broccoli with Garlic and Olive Oil**: A simple side dish packed with SMM and sulfur-rich nutrients.
- **Stir-Fried Brussels Sprouts with Tofu**: A plant-based dish rich in SMM and methionine.
- **Green Smoothie**: Blend raw spinach, celery, apple, and lemon juice for a nutrient-dense drink.
- **Fermented Vegetable Platter**: Include sauerkraut, kimchi, and pickled vegetables for a probiotic and SMM boost.

10. Supplementation (If Necessary)

While not commonly available as a standalone supplement, S-methylmethionine may be included in some gastrointestinal health supplements. Consult a healthcare provider before considering supplementation.

Optimal

Taurine

A sulfur-containing amino acid with antioxidant properties.

Optimal

Tyrosine

An amino acid involved in protein synthesis and a precursor to neurotransmitters such as dopamine and norepinephrine.

Optimal

Threonine (N-acetylthreonine)

N-acetylthreonine is an acetylated derivative of threonine, essential for protein production. Low levels could impair immune function and recovery, while high levels might suggest dietary imbalances.

Optimal

Uric acid Uric acid is an antioxidant byproduct of purine metabolism. High levels may indicate risk for gout, CVD, HTN, and metabolic disorders, while low levels could reduce antioxidant defense and increase oxidative stress.

Elevated

Valine is an essential branched-chain amino acid (BCAA) that plays a critical role in muscle growth, tissue repair, and energy production. Since the body cannot produce valine, it must be obtained from dietary sources. Elevated valine in the body usually indicates an imbalance in branched-chain amino acid (BCAA) metabolism, liver stress, or problems with protein breakdown or mitochondrial energy production. Valine is one of the three BCAAs (along with leucine and isoleucine) and is essential for muscle repair, energy, and nervous system function, but too much can create metabolic stress, especially if the liver or kidneys are compromised, or if there's excessive protein intake.

- **1. Temporarily Reduce BCAA Intake**
  - Valine is found in **high-protein foods**, particularly animal sources and supplements. Too much dietary or supplemental BCAA can overload your system.
    - Cut back on:
      - **Whey protein, collagen, and muscle-building powders**
      - **Red meat, poultry, eggs, fish, and dairy**
      - **Soy protein and legumes**
      - **BCAA supplements** (stop completely if using)
- **2. Support BCAA Metabolism (Liver + Mitochondria)**
  - BCAAs are metabolized mostly in **muscle**, then finished in the **liver and mitochondria**. Supporting these systems helps normalize valine levels.
    - Use:
      - **B-complex** (especially B1, B2, B6, and B7) – critical coenzymes
      - **Alpha-lipoic acid (ALA)** – improves mitochondrial function
      - **L-carnitine** – helps transport amino acids for energy use
      - **Magnesium + CoQ10** – mitochondrial energy boosters
- **3. Avoid Overtraining or Muscle Breakdown**
  - Over-exercising or high-intensity workouts can increase muscle protein breakdown, which **raises BCAAs in circulation**.
    - Go for:
      - Restorative exercise (yoga, walking, swimming)
      - More **recovery days** between intense workouts
      - **Epsom salt baths** for magnesium and muscle recovery
- **4. Improve Protein Digestion and Utilization**
  - Sometimes elevated valine is a sign of **poor protein absorption** or **gut dysfunction**.
    - Try:
      - **Digestive enzymes** with protease and HCl (before protein meals)
      - **Bitters** (gentian, artichoke, dandelion) to stimulate digestion
      - **Fermented foods** to enhance microbiome balance
- **5. Check for Metabolic or Genetic Factors**
  - High valine may indicate an impediment in **BCAA breakdown**, sometimes linked to enzyme variants in:
    - **BCKD (branched-chain ketoacid dehydrogenase) complex**
    - **Maple Syrup Urine Disease (rare but relevant in extreme cases)**

- Consider testing:
  - **Plasma amino acid profile** (to check if leucine/isoleucine are also high)
  - **Organic acids test**
  - **Liver function panel**
  - **Mitochondrial markers**
- **6. Support Detoxification + Elimination**
  - Help the body clear out metabolic waste and amino acid excess.
  - Focus on:
    - **Hydration** with lemon water or electrolytes
    - **Dandelion tea****milk thistle****burdock** for liver
    - **Sweating** (infrared sauna, movement)
    - **Castor oil packs** on liver or kidneys
- **Simple Summary Protocol:**
  - Take **LivinGene Cell Detox**
  - Reduce BCAA-heavy foods and stop any protein powders or BCAA supplements
  - Support liver + mitochondria with B-vitamins, ALA, carnitine, CoQ10
  - Avoid overtraining – increase recovery and do gentle exercise
  - Use digestive bitters or enzymes for better protein metabolism
  - Support detox pathways with herbs, water, and infrared sauna

Optimal

Xanthine Xanthine is a purine metabolite involved in nucleotide breakdown. Elevated levels may indicate oxidative stress or impaired purine metabolism, potentially contributing to inflammation and reduced longevity.

Oxidative Protection **Metrics**

Your Oxidative Protection Metrics reveal how well your body is defending itself from daily stress and damage. By looking at key antioxidants and stress markers, these metrics provide a comprehensive assessment of your body's resilience against oxidative harm and its overall protective efficiency.

Optimal

Acetyl-L-Carnitine

Acetyl-L-Carnitine is a compound involved in fatty acid metabolism and mitochondrial energy production. Elevated levels may indicate increased energy demand or metabolic adaptation, while low levels could suggest impaired mitochondrial function or reduced fatty acid utilization.

Optimal

Alpha-Tocopherol A form of Vitamin E with strong antioxidant properties

Elevated

Allantoin is a byproduct of uric acid oxidation. Unlike uric acid, which is enzymatically produced, allantoin forms only when uric acid is damaged by reactive oxygen species (ROS). Elevated allantoin suggests oxidative stress (too many free radicals), impaired antioxidant defenses (especially glutathione), purine overload or dysregulation, tissue damage or inflammation and possibly chronic inflammation, infection, or toxin exposure.

1. Rebuild Glutathione and Antioxidant Defenses
   - Antioxidant restoration is the top priority.
   - **NAC (600–1200 mg/day)** – precursor to glutathione
   - **Liposomal glutathione** – direct antioxidant protection
   - **Alpha-lipoic acid (ALA)** – regenerates GSH and protects mitochondria
   - **Vitamin C (buffered)** – reduces ROS and supports glutathione recycling
   - **Selenium + zinc** – essential cofactors for antioxidant enzymes
   - **Astaxanthin, Tocotrienols** – especially protective for lipids and mitochondrial membranes
2. Support Mitochondrial Function + DNA Repair
   - Oxidative stress damages DNA and mitochondrial membranes, which can spike allantoin.
   - Mitochondrial support:
     - Take LivinGene Cell Renew
     - **CoQ10 (ubiquinol)** – essential for electron transport + antioxidant action
     - **Magnesium threonate/glycinate** – supports ATP production and antioxidant enzymes
     - **PQQ + carnitine** – mitochondrial biogenesis + energy flow
     - **Phosphatidylcholine (PC)** – membrane repair and detox support
3. Balance Uric Acid and Purine Metabolism
   - Since allantoin comes from **oxidized uric acid**, it's helpful to **moderate uric acid production**.
   - Dietary shifts:
     - Reduce **purine-heavy foods** (organ meats, anchovies, red meat, alcohol, soda)
     - Increase **low-purine, anti-inflammatory foods**: leafy greens, beets, berries, cucumbers
     - Avoid **fructose**, which stimulates uric acid production
   - Natural inhibitors:
     - **Quercetin** – lowers xanthine oxidase (enzyme that forms uric acid)
     - **Resveratrol** – antioxidant + uric acid modulator
     - **Celery seed extract** – supports uric acid excretion
     - **Tart cherry juice (unsweetened)** – lowers both uric acid + inflammation
4. Hydrate + Flush
   - Proper excretion is key — allantoin is water-soluble and exits via urine.
   - Daily goals:
     - **2.5–3 L/day of filtered water**
     - Add **lemon**, **electrolytes**, or **trace minerals** to support detox enzymes
     - Herbal teas: **nettle**, **hibiscus**, **dandelion leaf** — for kidney support
5. Lower Total Inflammatory Load
   - Daily inflammation-reduction tools:
     - Take LivinGene Cell Shield
     - **Curcumin (Meriva or BCM-95)** – reduces oxidative and systemic inflammation
     - **Omega-3s (EPA/DHA)** – dampens ROS and cytokine release

- **Castor oil packs over the liver** – promote drainage + calm inflammation
- **Infrared sauna** or **Epsom salt baths** – reduce oxidative burden through sweat

Optional Testing (if deeper insight needed):

- **8-OHdG** – measures oxidative DNA damage
- **Glutathione (GSH + GSSG ratio)**
- **Uric acid + xanthine levels**
- **Heavy metal panel (lead, mercury)** – common hidden causes
- **Mold/mycotoxins** – if chronic inflammation is unexplained

Summary: How to Lower Allantoin Naturally

- Take **LivinGene Cell Detox, Cell Shield and Cell Renew**
- Rebuild antioxidant defenses with NAC, glutathione, ALA, vitamin C, and selenium
- Repair mitochondria with CoQ10, PC, magnesium, and PQQ
- Reduce purine load + balance uric acid with quercetin, celery seed, and low-purine diet
- Hydrate deeply and support kidneys with lemon water and herbal teas
- Lower inflammation daily with curcumin, omega-3s, sauna, and castor oil packs
- Test and treat for hidden toxins or infections if elevation is persistent

Optimal

Carotene Diols Carotenoid found in plants; antioxidant properties

Deficient

Ergothioneine is a unique sulfur-containing antioxidant that supports cellular health, reduces oxidative stress, and protects against inflammation. While the body cannot synthesize ergothioneine, you can increase its levels by consuming foods that naturally contain it. Here's how to enhance ergothioneine levels naturally:

1. Consume Ergothioneine-Rich Foods

- Ergothioneine is concentrated in certain fungi and plant-based foods. Incorporate these into your diet:
  - **Mushrooms:** Mushrooms are the richest natural source of ergothioneine. The varieties with the highest levels include:
    - **King Oyster Mushrooms**
    - **Shiitake Mushrooms**
    - **Oyster Mushrooms**
    - **Maitake Mushrooms**
    - **Porcini Mushrooms**
    - **White Button Mushrooms**
  - **Other Plant-Based Sources:**
    - **Legumes:** Black beans, kidney beans, and lentils contain moderate amounts of ergothioneine.
    - **Whole Grains:** Oats, barley, and bran.
    - **Certain Vegetables:** Spinach, asparagus, and beets (though levels are lower than in mushrooms).

2. Support Gut Health

- Your body absorbs ergothioneine in the small intestine through a specific transporter protein (OCTN1, encoded by the **SLC22A4** gene). A healthy gut ensures efficient absorption. To support gut health:
  - Include **probiotic foods**: Yogurt, kefir, sauerkraut, kimchi.
  - Eat **prebiotics**: Garlic, onions, bananas, and asparagus.
  - Avoid excessive alcohol and processed foods.

3. Choose Ergothioneine-Rich Protein Sources

- Certain animal products can contain ergothioneine if the animals consumed ergothioneine-rich feed (e.g., fungi or grains). For example:
  - **Organic Organ Meats:** Liver and kidney from grass-fed animals.
  - **Organic Eggs:** From free-range chickens fed a diverse diet.
  - **Wild Fish:** Small amounts may be present in fish like salmon and tuna.

4. Eat Fresh and Unprocessed Foods

- Ergothioneine levels in food are highest when the food is fresh. Avoid overprocessing or overcooking mushrooms and other ergothioneine-rich foods, as this can deplete their nutrient content.

5. Maintain a Balanced Diet

- A nutrient-dense diet supports overall antioxidant and sulfur metabolism, which complements ergothioneine's effects. Focus on:
  - **Sulfur-Rich Foods:** Garlic, onions, and cruciferous vegetables (e.g., broccoli, kale, Brussels sprouts).
  - **Antioxidants:** Berries, citrus fruits, nuts, and seeds.

6. Stay Hydrated

- Proper hydration helps with nutrient absorption and distribution, including ergothioneine.

7. Avoid Toxins and Oxidative Stress

- Ergothioneine helps protect cells from damage caused by free radicals. To reduce oxidative stress:
  - Avoid smoking, excessive alcohol, and environmental toxins.
  - Practice stress management techniques such as meditation and regular exercise.
- **8. Monitor Vegetarian or Vegan Diets**
  - Mushrooms are an excellent plant-based source of ergothioneine, making them a key food for vegetarians and vegans. Combine them with legumes and grains to create balanced, nutrient-rich meals.
- **9. Supplementation (Optional)**
  - Ergothioneine supplements are available and are being studied for their potential health benefits. However, food sources are typically sufficient for most individuals. Consult a healthcare professional before using supplements.
- **Sample Meal Ideas to Boost Ergothioneine:**
  - **Mushroom Stir-Fry**: Use shiitake, oyster, and button mushrooms with garlic, spinach, and whole grain rice.
  - **Lentil Mushroom Soup**: Combine lentils, king oyster mushrooms, carrots, and onions.
  - **Mushroom Omelet**: Add sauteed maitake mushrooms and spinach to your eggs.
  - **Roasted Mushrooms and Asparagus**: A simple side dish packed with ergothioneine.

Deficient

35

Lutein is a carotenoid antioxidant that plays a critical role in maintaining eye health and protecting against oxidative stress. It is particularly concentrated in the macula of the eye and helps filter harmful blue light. The body cannot produce lutein on its own, so it must be obtained through diet.

- **1. Eat Lutein-Rich Foods**
  - Lutein is found in various fruits and vegetables, especially those with vibrant yellow, orange, and green colors.
    - **Top Sources of Lutein:**
      - **Dark Leafy Greens**: Kale, Spinach, Swiss chard, Collard greens, Turnip greens
      - **Yellow and Orange Vegetables**: Corn, Carrots, Sweet potatoes, Yellow bell peppers
      - **Fruits**: Oranges, Papayas, Avocados (also contain healthy fats that enhance lutein absorption)
      - **Egg Yolks**: Eggs are a highly bioavailable source of lutein due to the fat content in yolks.
      - **Other Sources**: Zucchini, broccoli, peas, and pistachios.
- **2. Pair with Healthy Fats**
  - Lutein is a fat-soluble nutrient, so it is best absorbed when consumed with healthy dietary fats.
    - **Examples of Healthy Fats:**
      - Olive oil
      - Avocados
      - Nuts (almonds, walnuts)
      - Seeds (chia, flax, sunflower)
      - Fatty fish (salmon, mackerel, sardines)
    - **Tip**: Drizzle olive oil over salads with lutein-rich greens or pair vegetables with avocado for enhanced absorption.
- **3. Prepare Foods for Better Absorption**
  - Lutein bioavailability can be enhanced by the way you prepare your food.
    - **Cook Lightly**: Lightly steaming or sauteing vegetables (e.g., spinach or kale) can break down cell walls, making lutein more available.
    - **Blend or Puree**: Blending leafy greens into smoothies or soups can increase lutein release.
- **4. Include a Variety of Antioxidants**
  - Lutein works synergistically with other carotenoids like zeaxanthin. Consuming a wide range of colorful fruits and vegetables enhances the overall benefits.
- **5. Avoid Factors That Deplete Lutein**
  - Certain lifestyle habits can deplete lutein levels in the body.
    - **Things to Avoid:**
      - **Smoking**: Reduces antioxidant levels and increases oxidative stress.
      - **Excessive Alcohol**: May interfere with the absorption of carotenoids.
      - **Poor Diet**: Diets low in fruits, vegetables, and healthy fats may lead to inadequate lutein levels.
- **6. Supplementation (If Necessary)**
  - If dietary sources are insufficient, lutein supplements are available. They are often combined with zeaxanthin for optimal benefits, especially for eye health.
    - **Dosage**: Supplements typically range from 6-20 mg of lutein per day.
    - Always consult a healthcare provider before starting supplements, especially if you have existing health conditions.
- **Lifestyle Tips:**
  - Wear sunglasses to protect your eyes from UV light, complementing lutein's protective role.
  - Maintain overall eye health by reducing screen time and practicing the 20-20-20 rule (look 20 feet away for 20 seconds every 20 minutes).

Elevated

Methionine Sulfone is a naturally occurring oxidation product of the amino acid methionine. It may form in the body as a result of oxidative processes and is primarily linked to the intake of methionine- rich foods. Methionine sulfone forms when methionine is over-oxidized by reactive oxygen species (ROS) like hydrogen peroxide and superoxide. It's a marker of oxidative stress, cellular wear and tear, mitochondrial dysfunction, and even accelerated biological aging. Elevated Methionine Sulfone is a very important marker because it signals oxidative damage at the amino acid level, especially damage to methionine, which is a critical methyl donor and antioxidant defender in the body. It's closely related to damage seen in neurodegeneration, heart disease, diabetes, and cancer if left unchecked.

- **In short:**
  - **High Methionine Sulfone = your antioxidant defenses are overwhelmed.**
- **1. Flood the Body with Antioxidants to Neutralize ROS**
  - You need to **stop the oxidative attack** at the root.
    - Core antioxidant support:
      - **Glutathione** (liposomal) or **NAC** – master antioxidant defense
      - **Vitamin C** (buffered, high dose) – quenches free radicals
      - **Astaxanthin and Delta Tocotrienols** – mitochondrial antioxidant protection
      - **CoQ10 (ubiquinol form)** – essential for electron transport chain stability
      - **Alpha-lipoic acid (ALA)** – bridges fat- and water-soluble antioxidant systems
- **2. Supercharge Mitochondrial Function**
  - Mitochondria are the main source of ROS when they're stressed.
    - Mitochondria repair nutrients:
      - Take **LivinGene Cell Shield and Cell Renewal**
      - **PQQ** – stimulates mitochondrial biogenesis
      - **Acetyl-L-carnitine** – shuttles fatty acids into mitochondria
      - **Magnesium** – critical for mitochondrial enzymes
      - **Omega-3 DHA/EPA** – stabilize mitochondrial membranes
      - **B2 (riboflavin)** and **B3 (niacin/NAD+)** – electron transport chain cofactors
- **3. Lower Systemic Inflammation** and feeds into methionine oxidation.
  - Chronic inflammation **amplifies oxidative stress**
    - Anti-inflammatory support:
      - **Curcuminresveratrolgreen tea EGCGboswellia**
      - **Omega-3s, take LivinGene Cell Shield**
      - **Vitamin D3/K2** – optimize immune modulation
    - Remove:
      - Seed oils (canola, soybean, corn)
      - Sugar and processed foods
      - Environmental toxins (plastics, heavy metals if applicable)
- **4. Support Methylation and Methionine Recycling**
  - Methionine is critical for **methylation cycles** — if it's oxidized, methylation suffers.
    - Methylation support:
      - **Methylated B12 (methylcobalamin)**
      - **Methylated folate (5-MTHF)**
      - **Betaine (TMG)**
      - **SAMe** (optional, if extra methylation needed)
- **5. Calm the Nervous System + Lower Stress**
  - Chronic stress increases **cortisol**, which increases **oxidative load**.
    - Nervous system reset:
      - Breathwork, yoga, meditation, forest bathing
      - **Ashwagandhaholy basiltheanine**
      - **Morning sunlight exposure** to balance circadian rhythm
      - **Cold exposure** to activate antioxidant pathways (hormesis)
- **6. Prioritize Sleep for Oxidative Repair**
  - Deep sleep is the body's time to **clear ROS and repair oxidized proteins**.
    - Sleep support:
      - **7–9 hrs deep sleep** per night
      - **Glycinemagnesium threonatetheanine** – to enhance restorative sleep
      - **Low blue light exposure** after sunset to support melatonin (natural antioxidant)
- **Optional Testing (If Needed):**
  - If oxidative stress persists:
    - **8-OHdG** (DNA oxidative damage marker)
    - **Lipid peroxides** (lipid oxidation markers)
    - **Organic Acids Test (OAT)** – mitochondrial + oxidative status
    - **Glutathione levels** (RBC or serum)
- **Summary Protocol for Elevated Methionine Sulfone:**
  - Start with **LivinGene Cell Detox, Cell Shield and Cell Renewal**
  - Replenish antioxidant defenses with glutathione, NAC, vitamin C, CoQ10, astaxanthin
  - Repair mitochondria with PQQ, carnitine, magnesium, omega-3s, and NAD+ boosters
  - Lower systemic inflammation with curcumin, omega-3s, green tea, and vitamin D3
  - Support methylation pathways with B12, folate, betaine, and possibly SAMe Calm the nervous system daily to lower cortisol and oxidative output Prioritize deep sleep and circadian rhythm healing Consider deeper oxidative stress and mitochondrial testing if needed

Optimal

Retinol Retinol (Vitamin A) is essential for vision, immune function, and cellular communication.

Lipid Structure **Analysis**

Your Lipid Structure Analysis shows how well your body is using essential fats to support brain, heart, and cellular health. These healthy fats help reduce inflammation, protect your cells, and keep your body running smoothly. This analysis offers valuable insights into potential contributions to various health conditions.

Optimal

Docosahexaenoic Acid (DHA)

An omega-3 fatty acid that plays a key role in brain health and inflammation.

Optimal

Docosapentaenoic Acid (DPA)

A lesser-known omega-3 fatty acid involved in inflammatory processes.

Optimal

Eicosapentaenoic Acid (EPA)

An omega-3 fatty acid with anti-inflammatory effects, found in fish oils.

Deficient

Linoleic Acid (LA) is a type of omega-6 fatty acid that is classified as an **essential fatty acid**, meaning the body cannot produce it on its own, so it must be obtained through the diet. LA is the most common omega-6 fatty acid and serves as a precursor to other fatty acids, such as **arachidonic acid (AA)**, which play roles in inflammation, immune response, and cell membrane structure. While LA is necessary for health, excessive intake of omega-6 fatty acids (especially in the absence of sufficient omega-3 fatty acids) can lead to an imbalance that promotes inflammation in the body. This is why maintaining a healthy omega- 6 to omega-3 ratio is important. How to Increase LA in the Body Naturally:

- **1. Eat Foods Rich in LA:**
  - Many plant-based oils, nuts, and seeds are excellent sources of linoleic acid.
- **2. Choose Whole Foods Over Processed Foods:**
  - Linoleic acid is often overconsumed through processed and fried foods that use refined vegetable oils. Instead, prioritize whole-food sources like nuts and seeds.
- **3. Use High-Quality Cooking Oils:**
  - Opt for unrefined and cold-pressed oils, such as sunflower or safflower oil, to maximize the nutrient quality of LA.
- **4. Balance Omega-6 with Omega-3:**
  - To avoid excessive inflammation from high omega-6 intake, increase your omega-3 intake by eating fatty fish (salmon, sardines) or taking fish oil or algal oil supplements. Aim for a balanced omega-6 to omega-3 ratio (about 2:1 to 4:1).
- **5. Snack on Nuts and Seeds:**
  - Incorporating small portions of nuts and seeds into your diet is an easy way to boost LA intake while providing other essential nutrients.
- **Caution: Avoid Overconsumption of LA**
  - Although LA is essential, modern diets often provide an excessive amount of omega-6 fatty acids due to the widespread use of vegetable oils in processed foods. This can lead to an imbalance with omega-3 fatty acids, increasing the risk of inflammation-related diseases like cardiovascular disease, diabetes, and arthritis.

Optimal

Monounsaturated Fatty Acids (MUFA)

Monounsaturated Fatty Acids (MUFA) are healthy fats with a single double bond, involved in maintaining cell membrane fluidity and supporting cardiovascular health. MUFAs may reduce inflammation and oxidative stress, potentially benefiting metabolic health and longevity.

Critical (Low)

Octadecadienedioate is a type of dicarboxylic acid derived from the metabolism of linoleic acid, an essential omega-6 fatty acid. It belongs to a family of oxidized lipid molecules known as **oxylipins**, which are produced when polyunsaturated fatty acids (PUFAs) like linoleic acid undergo enzymatic or non-enzymatic oxidation. Octadecadienedioate is not directly consumed through diet but is a byproduct of metabolic processes involving linoleic acid. Since octadecadienedioate is a metabolic byproduct of linoleic acid, its levels in the body are indirectly influenced by increasing dietary intake of linoleic acid and enhancing the metabolic pathways involved in its oxidation. Here's how to achieve this:

- **1. Consume Linoleic Acid (LA) Sources:**
  - Linoleic acid is the precursor to octadecadienedioate, so ensuring adequate LA intake is the first step. Foods like walnuts, pumpkin seeds and avocados.
- **2. Support Fatty Acid Metabolism:**
  - Healthy metabolic processes ensure efficient production of octadecadienedioate. Support this by:
    - Eating a balanced diet with **adequate protein** for optimal enzymatic function.
    - Consuming **B vitamins** (found in whole grains, lean meats, and leafy greens) that are crucial for energy metabolism.
- **3. Exercise Regularly:**
  - Physical activity promotes healthy lipid metabolism and oxidative processes, potentially influencing the production of lipid metabolites like octadecadienedioate.
- **4. Support Mitochondrial Function:**
  - The mitochondria are responsible for fatty acid beta-oxidation, which is key to the formation of octadecadienedioate. To boost mitochondrial health:
    - Include foods rich in **coenzyme Q10 (CoQ10)** (e.g., fatty fish, organ meats)
    - Ensure sufficient **magnesium** intake (e.g., almonds, spinach, and bananas)
    - Consider moderate amounts of **polyphenol-rich foods** (e.g., berries, dark chocolate) to reduce oxidative stress
- **5. Optimize Antioxidant Intake:**
  - Since octadecadienedioate is associated with oxidative metabolism, having a balance of antioxidants can regulate its production. Eat foods high in antioxidants:
    - **Vitamin C:** Citrus fruits, bell peppers, and kiwis
    - **Vitamin E:** Almonds, sunflower seeds, and spinach
    - **Polyphenols:** Found in green tea, dark chocolate, and colorful fruits/vegetables

Deficient

Omega-3 Fatty Acids are a group of essential polyunsaturated fatty acids that play critical roles in overall health. They are called "essential" because the body cannot produce them on its own, so they must be obtained through diet or supplementation. Omega-3 fatty acids are crucial for brain function, heart health, reducing inflammation, and supporting the health of the eyes and skin. The three main types of omega-3 fatty acids are:

- **1. ALA (Alpha-Linolenic Acid):**
  - Found in plant sources such as flaxseeds, chia seeds, and walnuts. ALA is a precursor to EPA and DHA, though the body's conversion rate is very low (typically less than 10%).
- **2. EPA (Eicosapentaenoic Acid):**
  - Found in marine sources such as fatty fish and fish oil. EPA is known for its anti-inflammatory properties and cardiovascular benefits.
- **3. DHA (Docosahexaenoic Acid):**
  - Also found in fatty fish or algae, DHA is essential for brain development and function, as well as eye health.

Consider supplementation with **LC Cell Shield** which provides high doses of pure Omega 3 EPA and DHA from algae oil.

Deficient

Omega-6 Fatty Acids are a group of essential polyunsaturated fats required for various bodily functions, such as brain development, inflammation regulation, and maintaining healthy skin and hair. Like omega-3s, omega-6s are classified as "essential" fats because the body cannot produce them on its own, so they must be obtained through the diet. The most common type of omega-6 fatty acid is **linoleic acid (LA)**, which can be converted in the body into **arachidonic acid (AA)** and other metabolites. While omega-6 is essential, excessive intake, especially when unbalanced with omega-3, can promote inflammation, contributing to chronic diseases. Here's how to maintain balance:

- **1. Increase Omega-3 Intake:**
  - Include omega-3-rich foods like fatty fish (salmon, sardines, mackerel), chia seeds, flaxseeds, and walnuts.
- **2. Limit Refined and Processed Foods:**
  - Processed foods are often loaded with refined vegetable oils, which can significantly increase omega-6 intake.
- **3. Cook with Balanced Oils:**
  - Use oils with better omega-3 to omega-6 ratios, such as canola oil or flaxseed oil, instead of corn or soybean oil.
- **4. Signs of Omega-6 Deficiency:**
  - Though rare, omega-6 deficiency can result in symptoms such as:
    - Dry, scaly skin
    - Hair loss
    - Poor wound healing
    - Fatigue
    - Irritability

Optimal

Pentadecanoate (C15:0) Pentadecanoate (C15:0) is a saturated fatty acid with potential anti-inflammatory properties. High levels may indicate metabolic stress or excessive intake of specific dietary fats, while low levels could suggest impaired fat metabolism.

Deficient

Phosphatidylcholine (PC) is a type of phospholipid, a fat molecule that forms an essential part of all cell membranes. It plays a key role in maintaining cell structure and function, as well as in various physiological processes. PC is also a precursor to **choline**, an essential nutrient critical for liver function, brain health, and fat metabolism. Phosphatidylcholine is abundant in many foods, especially those rich in **lecithin** (a mixture of phospholipids). Below are natural ways to boost PC levels:

- **1. Eat Foods Rich in Phosphatidylcholine:**
  - **Organic Eggs (especially the yolks):** One of the best sources of phosphatidylcholine and choline.
  - **Organ meats (e.g., liver, kidney):** High in PC and other nutrients.
  - **Wild Fish:** Fatty fish such as salmon, mackerel, and sardines contain PC.
  - **Organic Soybeans and soy products:** Soy lecithin is a common source of phosphatidylcholine. Try soy milk, tofu, and edamame.
  - **Sunflower seeds and sunflower lecithin:** A plant-based alternative for boosting PC.
  - **Wheat germ:** A nutrient-dense source of phosphatidylcholine.
- **2. Lifestyle Tips to Support Phosphatidylcholine Levels:**
  - **Limit Alcohol Consumption:** Alcohol can deplete phosphatidylcholine in the liver, leading to liver damage over time. Moderation is key.
  - **Support Gut Health:** A healthy gut microbiome aids in the absorption and metabolism of PC from dietary sources. Include fermented foods like yogurt, kimchi, and sauerkraut to promote gut health.
  - **Maintain a Balanced Diet:** A diet rich in healthy fats, lean proteins, and whole foods ensures an adequate intake of phospholipids, including PC.
- **3. Signs of Phosphatidylcholine or Choline Deficiency:**
  - Fatty liver or liver dysfunction
  - Cognitive decline or memory problems
  - Muscle damage or weakness
  - Increased inflammation
  - Fat digestion issues

Deficient

Phosphoglycerides are a class of phospholipids, which are essential components of cell membranes. They consist of a glycerol backbone, two fatty acid chains, and a phosphate group attached to a functional molecule (such as choline, ethanolamine, or serine). Phosphoglycerides are critical for maintaining the structural integrity of cell membranes, enabling cellular communication, and supporting various biological functions. Phosphoglycerides can be obtained through dietary sources or by consuming foods rich in their precursors (e.g., choline, inositol, and certain fatty acids). Below are natural ways to boost phosphoglyceride levels:

- **1. Eat Foods Rich in Phosphoglycerides:**
  - **Egg Yolks:** Rich in phosphatidylcholine, a key phosphoglyceride.
  - **Organ Meats:** Liver and kidney contain high levels of phospholipids, including phosphoglycerides.
  - **Wild Fatty Fish:** Salmon, mackerel, herring, and sardines provide phospholipids essential for brain and cardiovascular health.
  - **Organic Soy and Soy Products:** Soy lecithin is a natural source of phosphoglycerides like phosphatidylcholine.
  - **Organic Dairy Products:** Butter, milk, and cheese contain small amounts of phosphoglycerides.
- **2. Consume Foods Rich in Precursors:**
  - Phosphoglycerides are synthesized in the body from key nutrients like **choline**, **inositol**, and **fatty acids**:
    - **Choline-Rich Foods:**
      - Eggs, beef, chicken, soybeans, broccoli, and cauliflower.
      - Choline is a precursor to phosphatidylcholine.
    - **Inositol-Rich Foods:**
      - Whole grains, beans, citrus fruits, and cantaloupe.
      - Inositol is a precursor to phosphatidylinositol.
    - **Healthy Fatty Acids:**
      - Omega-3 (e.g., from fatty fish, flaxseeds, and walnuts).
      - Omega-6 (e.g., from sunflower seeds, nuts, and vegetable oils).

Elevated

Phospholipase A2 (PLA2) is an enzyme that plays a crucial role in lipid metabolism and cellular signaling. It specifically acts on phospholipids, breaking them down by cleaving the fatty acid at the second position (the "sn-2" position) of the glycerol backbone. This reaction releases a free fatty acid (often arachidonic acid, a precursor to inflammatory molecules) and lysophospholipids, which are involved in cellular processes. While PLA2 is essential for normal cellular functions, excessive or dysregulated PLA2 activity can contribute to inflammatory conditions such as arthritis, asthma, and cardiovascular diseases. Instead, the focus is on modulating its activity to maintain healthy levels. Below are strategies to support balanced PLA2 activity naturally:

- **1. Block the Inflammatory Cascade at the Source**
  - Since PLA2 liberates arachidonic acid (AA), you want to **reduce AA** and **promote anti-inflammatory fatty acid balance**.
    - Nutritional Strategies:
      - Take LivinGene Cell Shield.
      - **High-dose Omega-3s (EPA/DHA)**: competes with AA for enzymatic activity → reduces inflammatory eicosanoids.
        - ***Dose: 2–4 grams EPA+DHA/day.***
      - **Eliminate seed oils**: corn, soy, safflower, sunflower, canola = all AA-rich.
      - Balance **Omega-6:3 ratio** (goal is 2:1 or even 1:1).
- **2. Stabilize and Protect Cell Membranes**
  - PLA2 breaks down **phospholipids**, so strengthening membranes is key.
    - Membrane-repair nutrients:
      - **Phosphatidylcholine (PC)** – restores membrane integrity.
      - **Tocotrienols (not just tocopherols!)** – powerful anti-inflammatory vitamin E family.
      - **Astaxanthin** – protects lipid membranes from oxidation.
      - **Lecithin (sunflower-based)** – supports healthy phospholipid balance.
- **3. Inhibit PLA2 Activity Naturally**
  - Certain compounds have been shown to **specifically inhibit PLA2** or its downstream inflammatory cascade.
    - Natural PLA2 inhibitors:
      - **Curcumin** – potent, direct PLA2 inhibitor.
      - **Boswellia serrata** – blocks 5-lipoxygenase (inflammatory eicosanoid pathway).
      - **Resveratrol** – modulates phospholipase activity and oxidative stress.
      - **Quercetin** – stabilizes mast cells and inhibits inflammatory lipid mediators.
- **4. Calm Neuroinflammation + Protect Brain**
  - If PLA2 is elevated, the brain is often affected due to **neuronal membrane breakdown** and inflammation.
    - Brain protectors:
      - **Magnesium threonate** – crosses BBB and calms neural excitability.
      - **Lion's Mane mushroom** – supports nerve regeneration.

- **L-theanine** – reduces neuroinflammation and glutamate toxicity
- **Melatonin (low dose)** – potent anti-inflammatory + brain antioxidant

5. **Support Liver Detox and Bile Flow**
- PLA2 activity is worsened by **toxins, alcohol, and poor fat digestion**.
- Detox support:
  - **Dandelion root, artichoke leaf, milk thistle**
  - **Bitter herbs before meals** (stimulates bile + fat clearance)
  - **Castor oil packs over liver** (encourages lymph + liver drainage)

6. **Reduce Systemic Stress and Cortisol**
- Cortisol and chronic stress can **upregulate inflammatory enzymes**, including PLA2.
- Stress reset:
  - **Ashwagandha, rhodiola, phosphatidylserine**
  - **Breathwork (4-7-8), forest bathing, morning sunlight**
  - **Restorative sleep** (7–9 hours, no blue light before bed)

Optional Testing (If Needed):
- If PLA2 remains high or inflammation is unresolved:
  - **Omega-3 Index** and **AA/EPA ratio**
  - **Lipid peroxides, hs-CRP, IL-6, TNF-alpha**
  - **Homocysteine** and **oxidized LDL** (vascular inflammation markers)

Summary Protocol to Lower PLA2 Naturally:
- Take **LivinGene Cell Detox and Cell Shield**
- Flood your system with Omega-3s (EPA/DHA) and remove pro-inflammatory seed oils
- Repair and protect membranes with PC, tocotrienols, and astaxanthin
- Inhibit PLA2 and downstream inflammation with curcumin, boswellia, and quercetin
- Calm brain inflammation with magnesium threonate, lion's mane, and L-theanine
- Support detox and bile flow with bitters, dandelion, and castor oil
- Manage stress and cortisol with adaptogens, breathwork, and deep sleep
- Test your Omega balance and inflammation markers if needed

Optimal

Polyunsaturated Fatty Acids (PUFA)

Polyunsaturated Fatty Acids (PUFA) are essential fats involved in cell structure and inflammation regulation. Excessive omega-6 PUFA intake may promote lipid peroxidation, leading to oxidative stress and inflammation, which could negatively impact longevity and metabolic health.

Optimal

Saturated Fatty Acids (SFA)

Saturated Fatty Acids (SFA) are fats with no double bonds, commonly found in animal products and some plant oils. High intake of SFAs can increase cholesterol levels and may promote inflammation, potentially impacting cardiovascular health and longevity when consumed in excess.

Optimal

Sphingomyelins Sphingomyelins are a type of sphingolipid essential for cell membrane integrity and signaling, particularly in nerve and brain tissues. Dysregulation of sphingomyelins may contribute to metabolic dysfunction and neurodegenerative diseases, potentially impacting longevity.

Blood Pressure, Cholesterol & Lipid **Panel**

Blood Pressure evaluates the force exerted by circulating blood against the walls of your arteries during heart contractions and relaxations, providing a critical measure of cardiovascular health. A Cholesterol and Lipid Panel assesses the concentrations of cholesterol and triglycerides in your bloodstream. Together, these metrics offer valuable insights into your cardiovascular risk, helping to identify potential predispositions to heart disease and stroke.

The results reflect epigenetic predictions of lipid related markers based on methylation, not direct serum levels.

Deficient

Apolipoprotein A1 (ApoA1) is essential for forming HDL particles, which help clear cholesterol from arteries. Higher levels are linked to better heart protection.

- **Boost Naturally:** Increase foods rich in omega-3s (salmon, flaxseeds) and take LivinGene's Cell Shield supplement, monounsaturated fats (olive oil, avocados), and fiber. Exercise, especially cardio, enhances ApoA1 levels.

Deficient

HDL-C (High-Density Lipoprotein Cholesterol) helps remove excess cholesterol from the bloodstream. Higher levels are protective, but overly high HDL may sometimes indicate dysfunction.

- **Boost Naturally:** Increase healthy fats, eat antioxidant-rich foods (berries, dark chocolate), and stay active.

Deficient

HDL Particle Size: Larger HDL particles are more efficient at carrying cholesterol away from arteries. Smaller particles may be less protective.

- **Improve Naturally:** Focus on healthy fats (avocados, nuts), regular aerobic exercise, and reducing refined carbs.

Critical (High)

Elevated LDL-C (Low-Density Lipoprotein Cholesterol) especially without other major risk factors, is not always dangerous on its own. What really matters is LDL particle size, oxidation status, and inflammatory context. But that said, persistently elevated LDL-C, especially if small and dense, can increase cardiovascular risk.

- **First, Understand What Elevated LDL-C Might Mean:**
  - **High cholesterol intake or production**
  - **Low LDL clearance by the liver**
  - **Oxidative stress and inflammation**
  - **Poor diet, insulin resistance, or underactive thyroid**
  - **Genetic hypercholesterolemia** (in rare cases)
- **1. Remove LDL-Inflaming Foods**
  - LDL only becomes dangerous when it's **oxidized**, **small and dense**, or **triggering inflammation**.
    - Reduce or eliminate:
      - **Sugar + refined carbs** (they increase small, dense LDL)
      - **Seed oils** (LA from soy, corn, canola, etc.) – oxidize easily
      - **Trans fats, fried foods**, processed snacks
      - **Alcohol**, especially beer, sugary cocktails
- **2. Add LDL-Lowering Foods**
  - Certain foods **help lower LDL naturally** and improve lipid profiles:
    - Add:
      - **Soluble fiber** (chia, flax, oats, apples, lentils)
      - **Avocados** – naturally lower LDL
      - **Garlic** **onions** **green tea** **pomegranate** – antioxidant effects
      - **Nuts** (especially walnuts and almonds)
      - **Cold-water fish** – for EPA/DHA (wild salmon, sardines)
- **3. Improve LDL Clearance from the Liver**
  - The liver clears LDL via **LDL receptors**. You can increase LDL clearance naturally.
    - Boost receptor function with:
      - **LivinGene Cell Detox**
      - **Berberine** (natural AMPK activator, statin-like in effect)

- **Artichoke leaf extract**milk thistle**dandelion**
- **Choline** – supports bile and fat transport (eggs, sunflower lecithin)
- **Vitamin C** – supports bile flow and detox pathways

- **4. Reduce Oxidized LDL (The Real Risk)**
  - Oxidized LDL (oxLDL) is more damaging than just high LDL-C.
    - Use:
      - Take **LivinGene Cell Shield and Cell Renewal**
      - **Vitamin E (mixed tocotrienols)** – protects LDL from oxidation
      - **Astaxanthin**,**quercetin curcumin resveratrol** – anti-inflammatory antioxidants
      - **CoQ10**, especially if the person is older or has fatigue
      - **Omega-3s (EPA + DHA)** – reduce LDL oxidation and inflammation
- **5. Shift LDL Particle Size (From Small to Big & Buoyant)**
  - Large, fluffy LDL particles are less dangerous than small, dense ones.
    - How:
      - **Lower carbs, especially processed ones**
      - **Increase healthy fats (avocados, olive oil, DHA)**
      - **Exercise** (especially cardio and strength training)
      - **Niacin (low dose)** – may help increase HDL and shift LDL pattern
- **6. Rule Out Underlying Triggers**
  - Sometimes elevated LDL-C is **secondary** to another issue:
    - Check for:
      - **Hypothyroidism** (TSH, free T3, free T4) – low thyroid slows LDL clearance
      - **Insulin resistance** (fasting insulin, HOMA-IR)
      - **Liver congestion or fatty liver**
      - **Genetics (FH)** – if LDL-C is very high (>200) despite clean lifestyle
- **Summary Protocol for Elevated LDL-C:**
  - Start with **LivinGene Cell Detox, Cell Shield and Cell Renewal**
  - Reduce sugar, seed oils, processed and fried foods
  - Add fiber-rich and LDL-lowering foods (avocado, flax, nuts, garlic)
  - Support liver and LDL clearance (berberine, artichoke, choline)
  - Take antioxidants to reduce LDL oxidation (tocotrienols, omega-3s)
  - Exercise regularly and reduce refined carbs to improve LDL particle size
  - Test for underlying thyroid or insulin resistance if LDL remains elevated

Critical (High)

Elevated LDL particle size usually means you have larger, buoyant LDL particles, which are less atherogenic (less likely to cause plaque buildup). This is typically a good thing, ***not bad***, unless total LDL-P (particle number) is also very high. That being said, **excessively large particles** can reflect poor clearance by LDL receptors (liver not recycling them), overproduction due to insulin resistance or thyroid issues and disrupted lipid transport or lipoprotein imbalances. So the goal isn't necessarily to "shrink" the size, but rather to optimize LDL particle number, reduce underlying inflammation, and ensure healthy lipid turnover.

- **1. Determine the Full Context**
  - Large LDL particle size is usually **protective**—but always assess alongside:
    - **Total LDL particle number (LDL-P)**
    - **ApoB**
    - **Oxidized LDL**
    - **Triglyceride-to-HDL ratio**
- **2. Enhance Liver Clearance of LDL Particles**
  - If LDL size is high but particles are not clearing, **LDL receptors may be downregulated**.
    - Boost LDL receptor activity with:
      - Start with **LivinGene Cell Detox**
      - **Berberine** (natural AMPK activator like metformin)
      - **Artichoke leaf**milk thistle**dandelion root** – support bile + liver
      - **Soluble fiber** (chia, flax, psyllium, oats, apples) – binds cholesterol
      - **Choline**,**taurine**, and **lecithin** for bile production and lipid flow
- **3. Balance Dietary Fat Intake**
  - High LDL particle size often reflects a **higher-fat, low-carb diet**, which may not be harmful—but should still be **balanced** and metabolically aligned.
    - Tips:
      - Keep fats **whole-food-based**: avocados, wild salmon, nuts, seeds
      - Avoid **overuse of butter, cream, coconut oil** if liver is sluggish
      - Support with bile bitters if eating higher fat
- **4. Reduce Lipid Oxidation (Even in Big Particles)**
  - Even large LDL particles can cause issues if they become **oxidized**.
    - Natural antioxidants:
      - Take **LivinGene Cell Shield**
      - **Vitamin E (mixed tocotrienols)**
      - **Astaxanthin**quercetin**resveratrol**green tea extract
      - **Omega-3 DHA/EPA** – reduces lipid peroxidation and systemic inflammation
      - **NAC** or **liposomal glutathione** – boosts internal detox + antioxidant power
- **5. Support Thyroid and Insulin Function**
  - Low thyroid = Slow LDL clearance
    - Insulin resistance = Overproduction of LDL particles
      - Test and support:
        - **Thyroid panel** (TSH, free T3, free T4, reverse T3, antibodies)
        - **Fasting insulin + HOMA-IR**
        - Use **berberine**, **chromium**, **ALA**, **selenium**, **iodine** if needed

- **6. Stay Active and Anti-Inflammatory**
  - Movement = better lipid metabolism, receptor expression, and liver detox.
    - Movement plan:
      - **Zone 2 cardio** – boosts fat metabolism
      - **Resistance training** – improves insulin sensitivity
      - **Sauna, breathwork, fasting** – enhance detox + repair
- **Summary Protocol for Elevated LDL Particle Size:**
  - Start with **LivinGene Cell Detox and Cell Shield**
  - Confirm if LDL particle **number** or ApoB is also elevated
  - Support LDL clearance through the liver with berberine, fiber, and bitters
  - Eat clean fats but avoid overdoing high-SFA keto-style fats if liver is sluggish
  - Use antioxidants to prevent lipid oxidation (vitamin E, DHA, astaxanthin)
  - Optimize thyroid and insulin health (test + support if needed)
  - Stay active with metabolic movement and liver-friendly lifestyle

Elevated

Elevated Phenylacetylglutamine (PAGln) is now recognized not just as a metabolic marker, but also as a microbiome-derived cardiovascular risk factor and a signal of phenylalanine metabolism imbalance due to gut dysbiosis. It's created when gut microbes ferment phenylalanine (an amino acid found in protein-rich foods), then the liver conjugates it with glutamine to make PAGln, which enters the bloodstream. Elevated levels suggest the wrong microbes are dominating, metabolizing amino acids in ways that produce toxic or inflammatory byproducts.

- **1. Rebalance the Microbiome**
  - Since PAGln is made by gut bacteria, this is priority #1.
    - Do:
      - **Spore-based probiotics** (e.g., *Bacillus subtilis*, *Bacillus coagulans*)
      - **Bifidobacteria + Lactobacillus strains** (targeting amino acid balance)
      - **Prebiotics**: acacia fiber, partially hydrolyzed guar gum (PHGG), inulin
      - **Polyphenols**: green tea, pomegranate, cranberry – support beneficial flora
    - Optional: **SIBO/antimicrobial herbs** (e.g., oregano, berberine) if there are signs of overgrowth
- **2. Increase Fiber + Reduce Protein Fermentation**
  - Excess protein in the colon fuels PAGln production.
    - Cut back on:
      - Excess red meat
      - High-protein powders (especially if bloating/gas is present)
      - Low-fiber, high-protein keto-style diets
    - Add:
      - **Soluble fiber**: chia, flax, oats, psyllium
      - **Resistant starch**: green banana flour, cooked/cooled potatoes
      - **Colorful, polyphenol-rich veggies and herbs** (diverse plant intake)
- **3. Limit Phenylalanine-Heavy Foods**
  - Phenylacetylglutamine is derived from phenylalanine → phenylacetate → PAGln.
    - Moderate intake of:
      - Red meat, dairy, eggs
      - Artificial sweeteners with phenylalanine (e.g., aspartame)
    - Focus on:
      - Clean plant proteins (e.g., lentils, quinoa, hemp seeds)
      - Moderate animal proteins with lots of veggies
- **4. Support Liver Conjugation & Phase II Detox**
  - The liver conjugates phenylacetate with **glutamine** to form PAGln. Supporting the liver can help shift how these byproducts are managed.
    - Use:
      - **LivinGene Cell Detox**
      - **Milk thistle**/**artichoke leaf**/**dandelion root**
      - **Glutathione**/**NAC**/**glycine**/**taurine**
      - **Bitter herbs**/**lemon water**/**beets** – for bile flow
- **5. Address Cardiovascular Risk (If Applicable)**
  - High PAGln has been linked to:
    - **Platelet aggregation**
    - **Increased clotting**
    - **Arterial inflammation**
  - Protective nutrients:
    - **Omega-3s** (EPA/DHA) – reduce clotting + inflammation; take **LivinGene Cell Shield**
    - **Vitamin K2** – guides calcium away from arteries
    - **Tocotrienols**/**resveratrol**/**quercetin**/**green tea extract**
    - **Magnesium** – vascular relaxant
- **6. Lower Systemic Stress + Inflammation**
  - Stress, poor sleep, and sympathetic dominance alter gut flora and increase intestinal permeability.
    - Practice:
      - Breathwork, vagus nerve toning, grounding
      - 7–9 hrs of deep sleep
      - Gentle movement, yoga, sun exposure
- **Summary Protocol for Elevated PAGln:**
  - Start with **LivinGene Cell Detox and Cell Shield**
  - Rebuild the microbiome with prebiotic fiber, probiotics, and plant polyphenols

- Reduce excess phenylalanine and protein fermentation by moderating animal protein and increasing fiber
- Support liver detox with glutathione, bitters, and glycine conjugation nutrients
- Address cardiovascular risk with omega-3s, vitamin K2, and vascular antioxidants
- Restore stress resilience and circadian rhythm to stabilize gut-brain-liver health
- Consider advanced testing: stool microbiome, organic acids, and inflammation markers

Optimal

Systolic Blood Pressure Systolic Blood Pressure (SBP) is the pressure in arteries during heartbeats. Elevated SBP is strongly associated with cardiovascular disease, kidney damage, and reduced longevity due to increased vascular strain and systemic inflammation.

Optimal

Total Triglyceride Total triglycerides are the primary form of fat in the blood, stored for energy use in adipose tissue. Elevated levels are associated with insulin resistance, metabolic syndrome, and increased cardiovascular risk, making them a critical marker for assessing metabolic health and longevity.

Elevated

VLDL-C is produced by the liver to carry triglycerides and cholesterol to tissues. But when it's too high, it signals excess triglyceride production (often from sugars, refined carbs, alcohol), fatty liver development, insulin resistance or prediabetes, increased cardiovascular risk, low-grade systemic inflammation. VLDL particles are atherogenic (they contribute to plaque), especially if they're small, dense, and oxidized.

1. **Eliminate Fructose and Refined Carbohydrates**
   - High VLDL = liver is turning **excess carbs and sugar into fat (triglycerides)**
     - Eliminate:
       - Soda, fruit juice, agave, processed foods, pastries, alcohol
       - Excess starches (white bread, pasta, etc.)
     - Replace with:
       - Fiber-rich veggies, low-glycemic fruits (berries), clean proteins, healthy fats
2. **Use Intermittent Fasting and Time-Restricted Eating**
   - This improves **insulin sensitivity** and reduces **hepatic triglyceride production**.
     - Try:
       - **14–16 hour fasting window** (e.g., dinner at 6pm, eat again at 10am)
       - Stop eating **3 hours before bed** to lower nighttime lipogenesis
3. **Exercise to Mobilize Fat from the Liver**
   - Exercise lowers VLDL-C by burning triglycerides and improving insulin sensitivity.
     - Best forms:
       - **Zone 2 cardio** (brisk walking, biking, swimming 30–45 min)
       - **Resistance training** (2–3x/week)
       - Even 10–15 minutes/day makes a difference
4. **Support Liver Detoxification**
   - Your liver makes VLDL particles — if it's sluggish or fatty, VLDL rises.
     - Liver-loving nutrients:
       - Take **LivinGene Cell Detox**
       - **Milk thistle**, **NAC**, **curcumin**, **dandelion root**
       - **Bitter herbs** before meals
       - **Castor oil packs** over liver area (nightly during detox)
5. **Supplement with Targeted Nutrients**
   - Specific nutrients reduce triglycerides and normalize VLDL production.
     - Best options:
       - Take **LivinGene Cell Shield**
       - **Omega-3s (EPA/DHA)**: lower triglycerides and VLDL-C
       - **Berberine**: improves insulin sensitivity and lipid metabolism
       - **Tocotrienols**: lower cholesterol production at the liver
       - **Niacin (flush or slow-release)**: reduces VLDL particle output
       - **Magnesium**: improves glucose control and lipid profile
       - **Soluble fiber**: psyllium, flaxseed, baobab
6. **Lower Chronic Stress and Cortisol**
   - High cortisol = increased blood sugar and triglycerides → higher VLDL.
     - Daily stress reducers:
       - Breathwork, prayer, meditation, grounding
       - Adaptogens: **ashwagandha**, **rhodiola**, **holy basil**

- 7–9 hours of deep sleep

- **Optional Testing:**
  - If VLDL-C remains elevated:
    - **TriglyceridesApoBLDL particle number**
    - **Fasting insulinHOMA-IRHbA1c**
    - **Liver enzymes** (ALT, AST),**fatty liver ultrasound**
    - **High-sensitivity CRP** (inflammation marker)
- **Summary Protocol to Lower VLDL-C:**
  - Take **LivinGene Cell Shield**
  - Eliminate sugars, alcohol, and refined carbs to stop liver fat production
  - Use intermittent fasting and evening cut-offs to reset fat metabolism
  - Move daily — especially Zone 2 cardio and resistance training
  - Support the liver with herbs, bitters, and castor oil packs
  - Take key nutrients: omega-3s, berberine, tocotrienols, magnesium, fiber
  - Reduce stress and sleep well to prevent triglyceride spikes
  - Monitor deeper labs if needed for full metabolic clarity

Deficient

VLDL Particle Size: Smaller VLDL particles are linked to higher cardiovascular risk, while larger ones are less harmful.

- **Improve Naturally:** Reduce processed foods, focus on healthy fats, and increase fiber intake.

Elevated

Elevated Vanillyl Acetic Acid (VAA) typically reflects elevated catecholamine metabolism. In plain terms: the body is breaking down a lot of adrenaline (epinephrine) and norepinephrine, which are stress hormones. This can point to chronic stress, overactivation of the sympathetic nervous system, or sometimes even neuroendocrine tumors (like pheochromocytoma in rare cases). But in most people, it's a sign of long-term stress overload.

- **What Elevated VAA Indicates:**
  - Chronic **fight-or-flight activation**
  - **Adrenal overdrive** or "**wired but tired**" fatigue
  - **Emotional stress**, trauma, overtraining
  - High **caffeine** or stimulant use
  - Possibly **poor methylation** or **low antioxidant defenses**
  - Rarely: adrenal or neuroendocrine tumor (if very high—needs medical eval)
- **1. Turn Off the Sympathetic Stress Response**
  - This is foundational. VAA elevation = too much catecholamine output, so we want to **calm the nervous system** and shift into parasympathetic mode.
    - Daily stress reset habits:
      - **Deep belly breathing** (especially exhale-focused)
      - **YogaTai Chi** , or **Qi Gong**
      - **Grounding** (barefoot in nature)
      - **Meditation or prayer** (5–10 min/day minimum)
      - **Vagal nerve stimulation** – humming, gargling, cold exposure
- **2. Support Adrenal + Catecholamine Balance**
  - The body breaks down dopamine, norepinephrine, and epinephrine into VAA—so if it's high, adrenal pathways need support.
    - Use:
      - **Vitamin C** (high dose – 1,000–2,000 mg/day) – adrenal antioxidant
      - **B5 (pantothenic acid)** – essential for adrenal hormone production
      - **Magnesium glycinate or threonate** – calms nerves, supports cortisol balance
      - **L-theanineashwagandhaholy basil** – calm adaptogens
      - **Phosphatidylserine** – modulates cortisol, especially if wired at night
- **3. Reduce Stimulants + Excitatory Triggers**
  - Caffeine and stimulants (even natural ones) can spike catecholamine release and worsen VAA elevation.
    - Reduce or avoid:
      - Coffee, energy drinks, green tea (if sensitive)
      - Pre-workouts and nootropics
      - High-volume or high-intensity training (temporarily)
      - Violent media or emotional overstimulation
    - Replace with:
      - **Tulsi tearooibos** , or **chamomile**
      - Nature walks, low-heart-rate movement
- **4. Support Methylation + COMT Pathways**
  - VAA is a **breakdown product of catecholamines**. Methylation enzymes like **COMT** help metabolize them safely. If these pathways are sluggish, VAA builds up.
    - Use:
      - **Methylated B12 (methylcobalamin)**

- **Methylated folate (5-MTHF)**
- **MagnesiumzincSAMecholinebetaine (TMG)**
- Consider genetic support if COMT/MTHFR mutations are present.

5. **Reduce Oxidative Stress**
   - Catecholamine breakdown creates **oxidative byproducts**, so antioxidant support is key.
   - Use:
     - **Glutathione (liposomal or NAC)**
     - **Alpha-lipoic acid (ALA), CoQ10** (**ubiquinol form)**,
     - **Resveratrolcurcumingreen tea extract**

Optional Testing:

- **Salivary cortisol panel** – to assess adrenal rhythm
- **Organic acids test** – to confirm VAA and other neurotransmitter metabolites
- **COMT, MTHFR, MAOA** genes if patterns persist
- **Plasma or urine catecholamines** (if medically indicated)

Summary Protocol for Elevated VAA (Vanillyl Acetic Acid):

- Reduce stress with breathwork, meditation, grounding, and parasympathetic support
- Take adrenal support nutrients: vitamin C, B5, magnesium, adaptogens. Avoid
- caffeine + stimulants that spike norepinephrine and epinephrine. Support methylation
- pathways with B12, folate, choline, and TMG. Add antioxidants to reduce byproducts
- of catecholamine breakdown. Use gentle movement, calming herbs, and sleep support
- as needed. Consider further adrenal and neurotransmitter testing if VAA remains high.

Metabolic Efficiency **Markers**

Your Metabolic Efficiency panel shows how well your body uses fat and carbohydrates for energy. Ideally, your body should burn fat for fuel when you're resting or active for long periods. These markers show how well you're tapping into fat stores, balancing blood sugar, and supporting steady energy.

Deficient

Acetoacetate (AcAc) is one of the primary ketone bodies produced by the liver during ketosis. It serves as an alternative energy source when glucose levels are low. Acetoacetate is converted into either Beta-Hydroxybutyrate (BHB) or acetone to fuel the brain, heart, and muscles. Elevated AcAc is common during fasting, ketogenic diets, or prolonged exercise.

- **Why It Matters:** Balanced acetoacetate levels indicate effective fat metabolism and energy efficiency. Extremely high levels may signal **ketoacidosis**, often seen in uncontrolled diabetes.
- **Improve Naturally:** Follow a ketogenic diet (high fat, moderate protein, low carb) to increase AcAc production. Engage in intermittent fasting or extended fasts to encourage ketone formation. Perform aerobic exercise or endurance training to naturally elevate ketone production. Include medium-chain triglycerides (MCTs) in your diet — MCT oil or coconut oil rapidly converts to ketones. Consume foods rich in omega-3 fatty acids (like salmon, flaxseeds, and walnuts) to support fat metabolism. Take LivinGene's Cell Shield supplement for Omega 3 EPA/DHA and MCTs.

Optimal

Beta-Hydroxybutyrate (BHB)

Beta-Hydroxybutyrate (BHB) is a ketone body produced during fat metabolism, primarily in the liver, and serves as an alternative energy source for the brain and muscles, especially during periods of low carbohydrate intake or fasting.

Critical (High)

DNAm Leptin (DNA Methylation Leptin) is a marker related to leptin levels, a hormone that regulates hunger and energy balance. When DNAm Leptin is elevated, it usually means the body has been in a long-term state of metabolic stress, inflammation, or energy surplus, leading to impaired satiety signaling, so even with high leptin, the brain doesn't "hear" the signal to stop eating. This is a key issue in obesity or weight loss resistance, insulin resistance, chronic inflammation and hormonal imbalance. Let's explore **natural strategies to lower elevated DNAm Leptin** and reset leptin sensitivity.

- **1. Start the Day with Protein + Light**
  - Leptin is circadian-regulated. **Early morning habits reset leptin signaling** and brain sensitivity.
    - Daily leptin-reset ritual:
      - **20–30g of protein** within 30–60 minutes of waking (e.g., pastured eggs, collagen smoothie)
      - **Morning sunlight** on skin and eyes (within 30 mins of waking)
      - **No snacking between meals** — eat 2–3 leptin-aware meals/day
- **2. Reduce Inflammation + Hypothalamic Stress**
  - Leptin resistance is often **inflammation-driven**, especially in the brain.
    - Anti-inflammatory support:
      - **Omega-3s (EPA/DHA)** – calm hypothalamic inflammation, take **LivinGene Cell Shield**
      - **Curcumin**resveratrol**green tea extract**quercetin
      - **Magnesium threonate**phosphatidylserine**ashwagandha** – reduce neuroinflammation + stress load
- **3. Honor Circadian Rhythm (Leptin is Clock-Linked)**
  - Leptin is **tied to the body's biological clock**. Disruption of circadian rhythms worsens leptin resistance.
    - Optimize circadian signals:
      - **Wake up + go to bed at the same time**
      - **Avoid blue light after sunset** (Eat dinner early (3+ hours before bed)
      - **Sleep 7–9 hours** with a cool, dark room
- **4. Use Exercise to Restore Leptin Sensitivity**
  - Movement helps **burn fat, reduce inflammation, and restore brain leptin signals**.
    - Best choices:
      - **Morning walks in natural light**
      - **Resistance training** (2–4x/week)
      - **HIIT or sprint training** (1–2x/week)
      - **Zone 2 cardio** (brisk walking or cycling) for fat-burning and insulin sensitivity
- **5. Balance Insulin First to Heal Leptin**

- Leptin resistance often follows **insulin resistance**—so this is the root system to address first.
  - Tools for insulin sensitivity:
    - **Berberine**, **chromium**, **alpha-lipoic acid**, **cinnamon**
    - **Intermittent fasting (14–16 hrs)**
    - **Low-glycemic, whole-food meals** with high fiber and protein
- **6. Consider Epigenetic Repair Nutrients**
  - Since DNAm Leptin is an **epigenetic marker**, you can help **remethylate and balance gene expression** naturally.
    - Use:
      - **Methylated B12 (methylcobalamin)** and **5-MTHF** (folate)
      - **Choline**, **zinc**, **magnesium**, **SAMe**, **betaine (TMG)**
      - **Sulforaphane** from broccoli sprouts – promotes DNA repair + demethylation
- **Summary Protocol for Elevated DNAm Leptin:**
  - Take **LivinGene Cell Shield**
  - Start the day with protein + sunlight to reset brain-leptin signaling
  - Use anti-inflammatory + neuroprotective nutrients (EPA, curcumin, magnesium)
  - Follow a strong circadian rhythm routine (light exposure, early meals, sleep)
  - Incorporate strength training, morning walks, and fat-burning movement
  - Heal insulin resistance with fasting, berberine, fiber-rich meals
  - Use methylation nutrients (B12, folate, choline, sulforaphane) to support epigenetic rebalancing

Elevated

Glucose: Blood sugar levels that reflect how your body processes carbohydrates. Elevated levels may indicate insulin resistance, chronic stress, poor mitochondrial function, lack of muscle activity or diabetes risk.

- **1. Shift to a Low-Glycemic, Real Food Diet**
  - Focus on:
    - Non-starchy vegetables: leafy greens, broccoli, cauliflower, zucchini
    - Healthy fats: olive oil, avocado, coconut, nuts/seeds
    - Clean proteins: wild-caught fish, pasture-raised eggs, grass-fed meats
    - Low-glycemic fruits: berries, citrus, green apple
  - Avoid:
    - Refined carbs: white bread, pasta, pastries
    - Sugar (especially fructose, HFCS)
    - Juice, soda, alcohol
    - Ultra-processed packaged foods
- **2. Move Every Day (Especially After Meals)**
  - Why it works: Movement helps **burn glucose immediately** and **improves insulin sensitivity**.
    - What to do:
      - **10–15 min walks after each meal**
      - **Zone 2 cardio** 30 min/day
      - **Strength training** 2–3x/week (builds glucose-burning muscle)
- **3. Try Intermittent Fasting or Time-Restricted Eating**
  - Start with:
    - **12–14 hour overnight fast** (stop eating by 7–8 PM)
    - **No late-night snacking** → helps lower morning glucose
  - Consider:
    - One day/week of **24-hour fast** or **fasting-mimicking meals** if tolerated
- **4. Use Glucose-Lowering Nutrients**
  - **Berberine:** Activates AMPK, lowers glucose, improves insulin
  - **Magnesium:** Required for glucose transport into cells
  - **Ceylon Cinnamon**: Enhances insulin receptor activity
  - **Alpha-lipoic acid (ALA)**: Helps cells use glucose efficiently
  - **Chromium**: Supports glucose uptake
  - **Inositol**: Especially helpful for hormonal blood sugar imbalance
- **5. Use Blood Sugar-Stabilizing Herbs + Foods**
  - Functional plants:
    - **Bitter melon** – mimics insulin
    - **Fenugreek** – slows glucose absorption
    - **Turmeric + black pepper** – lowers inflammation + stabilizes glucose
    - **Apple cider vinegar** – 1–2 tsp before meals flattens post-meal glucose spikes
- **6. Lower Cortisol + Calm the Nervous System**
  - Stress raises glucose via cortisol (fight or flight → sugar dump)
    - Daily calming tools:
      - **4-7-8 breath**, grounding, nature time
      - **Adaptogens**: ashwagandha, rhodiola, tulsi
      - **Magnesium glycinate**, **L-theanine**
      - Sleep 7–9 hours, dark room, early bedtime
- **7. Drink Your Glucose-Lowering Teas**
  - Try:
    - **Cinnamon tea**
    - **Ginger + turmeric**
    - **Green tea or matcha**
    - **Berberine extract tea** (bitter but powerful)

- Optional Testing:
  - **Fasting insulinglucoseHbA1cHOMA-IR**
  - **CGM (Continuous Glucose Monitor)** for real-time blood sugar feedback
  - **Lipid panel** (triglycerides often rise with high glucose)
- Summary Protocol to Lower Glucose Naturally:
  - Cut sugar + refined carbs, eat clean proteins and healthy fats
  - Walk after meals and build muscle for glucose uptake
  - Use intermittent fasting to reset insulin
  - Take berberine, magnesium, ALA, cinnamon, and chromium
  - Add herbs like bitter melon and turmeric to meals
  - Lower stress daily – breathwork, adaptogens, deep sleep
  - Drink glucose-lowering teas and ACV before meals

Critical (High)

HgbA1c (Hemoglobin A1c) is a long-term marker of blood sugar control, reflecting average glucose levels over 2-3 months. Elevated levels signal poor glucose regulation.

Improve Naturally: Reduce refined carbs and sugary foods and focus on fiber-rich meals to balance blood sugar. Engage in strength and cardio training and prioritize sleep and stress management.

Optimal

Palmitoylcarnitine

Palmitoylcarnitine plays a role in fatty acid transport into mitochondria for oxidation. High levels can signal impaired fatty acid oxidation, while low levels might affect energy production from fats.

Elevated

Elevated Phenylacetylglutamine (PAGln) is now recognized not just as a metabolic marker, but also as a microbiome-derived cardiovascular risk factor and a signal of phenylalanine metabolism imbalance due to gut dysbiosis. It's created when gut microbes ferment phenylalanine (an amino acid found in protein-rich foods), then the liver conjugates it with glutamine to make PAGln, which enters the bloodstream. Elevated levels suggest the wrong microbes are dominating, metabolizing amino acids in ways that produce toxic or inflammatory byproducts.

- **1. Rebalance the Microbiome**
  - Since PAGln is made by gut bacteria, this is priority #1.
    - Do:
      - **Spore-based probiotics** (e.g., *Bacillus subtilis*, *Bacillus coagulans*)
      - **Bifidobacteria + Lactobacillus strains** (targeting amino acid balance)
      - **Prebiotics**: acacia fiber, partially hydrolyzed guar gum (PHGG), inulin
      - **Polyphenols**: green tea, pomegranate, cranberry – support beneficial flora
    - Optional: **SIBO/antimicrobial herbs** (e.g., oregano, berberine) if there are signs of overgrowth
- **2. Increase Fiber + Reduce Protein Fermentation**
  - Excess protein in the colon fuels PAGln production.
    - Cut back on:
      - Excess red meat
      - High-protein powders (especially if bloating/gas is present)
      - Low-fiber, high-protein keto-style diets
    - Add:
      - **Soluble fiber**: chia, flax, oats, psyllium
      - **Resistant starch**: green banana flour, cooked/cooled potatoes
      - **Colorful, polyphenol-rich veggies and herbs** (diverse plant intake)
- **3. Limit Phenylalanine-Heavy Foods**
  - Phenylacetylglutamine is derived from phenylalanine → phenylacetate → PAGln.
    - Moderate intake of:
      - Red meat, dairy, eggs
      - Artificial sweeteners with phenylalanine (e.g., aspartame)
    - Focus on:
      - Clean plant proteins (e.g., lentils, quinoa, hemp seeds)
      - Moderate animal proteins with lots of veggies
- **4. Support Liver Conjugation & Phase II Detox**
  - The liver conjugates phenylacetate with **glutamine** to form PAGln. Supporting the liver can help shift how these byproducts are managed.
    - Use:
      - **LivinGene Cell Detox**
      - **Milk thistle, artichoke leaf, dandelion root**
      - **Glutathione, NAC, glycine, taurine**

        - **Bitter herbs, lemon water, beets** for bile flow
- **5. Address Cardiovascular Risk (If Applicable)**
    - High PAGln has been linked to:
        - **Platelet aggregation**
        - **Increased clotting**
        - **Arterial inflammation**
    - Protective nutrients:
        - **Omega-3s (EPA/DHA)** – reduce clotting + inflammation, take **LivinGene Cell Shield**
        - **Vitamin K2** – guides calcium away from arteries
        - **Tocotrienolsresveratrolquercetingreen tea extract**
        - **Magnesium** – vascular relaxant
- **6. Lower Systemic Stress + Inflammation**
    - Stress, poor sleep, and sympathetic dominance alter gut flora and increase intestinal permeability.
        - Practice:
            - Breathwork, vagus nerve toning, grounding
            - 7–9 hrs of deep sleep
            - Gentle movement, yoga, sun exposure
- **Summary Protocol for Elevated PAGln:**
    - Start with **LivinGene Cell Detox and Cell Shield**
    - Rebuild the microbiome with prebiotic fiber, probiotics, and plant polyphenols
    - Reduce excess phenylalanine and protein fermentation by moderating animal protein and increasing fiber
    - Support liver detox with glutathione, bitters, and glycine conjugation nutrients
    - Address cardiovascular risk with omega-3s, vitamin K2, and vascular antioxidants
    - Restore stress resilience and circadian rhythm to stabilize gut-brain-liver health
    - Consider advanced testing: stool microbiome, organic acids, and inflammation markers

Immune Function **Assessment**

An Immune Function Assessment evaluates antibody concentrations in your blood and examines your body's efficiency in detecting, targeting, and eliminating pathogens or harmful invaders. It looks at your key immune cells and markers to see if your defenses are strong, balanced, or in need of support. This analysis offers valuable insights into whether your immune system is underactive, overactive, or just right.

These results are not direct blood cell counts. They are based on your DNA methylation profile and reflect how your immune system has been functioning over time, compared to others your age. This approach helps identify immune trends, not just a single day's lab result.

Critical (Low)

CD4/CD8 Ratio measures the balance between two types of T-cells:

- **CD4 cells** (helper T-cells) activate the immune response.
- **CD8 cells** (cytotoxic T-cells) destroy infected or cancerous cells.

- Low ratios may indicate immune suppression (e.g., chronic infection), while high ratios may suggest an overactive immune response.
- **Improve Naturally:** Support immune balance with zinc (pumpkin seeds), vitamin D (sun exposure, fatty fish), and selenium (Brazil nuts). Prioritize gut health with probiotics and prebiotics. Manage stress through mindfulness, yoga, or meditation and engage in regular exercise, especially aerobic activities.

Deficient

C-Reactive Protein (CRP) is a key marker of inflammation in the body. Elevated levels may indicate chronic inflammation, infection, or cardiovascular risk.

- **Improve Naturally:** Prioritize anti-inflammatory foods like turmeric, ginger, and green leafy vegetables. Increase omega-3s (salmon, flaxseeds) to reduce inflammation and take LivinGene's Cell Shield supplement. Manage stress through meditation or breathing exercises. Regular exercise helps lower CRP over time.

Deficient

Lymphocytes is a type of white blood cell that plays a key role in fighting infections and supporting immune function. Low levels may indicate immune suppression; high levels may suggest infection or autoimmune activity.

- **Improve Naturally:** Support immune function with vitamin C (citrus fruits), zinc, and elderberry. Maintain a nutrient-dense diet rich in whole foods and avoid excessive alcohol, which can suppress lymphocyte production. Engage in regular physical activity and ensure adequate sleep.

Optimal

Neutrophils A neutrophil count indicates levels of neutrophils, important for immune defense.

Elevated

Neutrophil to Lymphocyte Ratio (NLR) is the ratio that reflects immune balance and systemic inflammation. NLR = Neutrophils ÷ Lymphocytes. It's a simple but powerful inflammation and immune balance marker. Elevated NLR is associated with:

- High neutrophils (acute stress, infection, inflammation)
- Low lymphocytes (immune suppression, chronic stress, viral depletion)
- Strongly linked to**chronic inflammationmetabolic dysfunctioncardiovascular disease**autoimmune conditions**aging** and even long COVID

- **↑ Lower Neutrophil-Driven Inflammation**
  - ↑ High neutrophils = innate immune system on "high alert."

- Use:
  - **Omega-3s (EPA/DHA)** – reduce neutrophil activity and cytokine storm; take LivinGene Cell Shield
  - **Curcumin**, **boswellia**, **quercetin**, **resveratrol** – lower neutrophil activation
  - **Vitamin D3/K2**, **magnesium**, **green tea extract**
- Avoid:
  - Seed oils, sugar, processed foods, alcohol – all increase neutrophilic inflammation

2. **Strengthen Lymphocytes + Immune Modulation**
   - Low lymphocytes often = stress, viral suppression, or poor recovery capacity.
   - Support lymphocyte production and balance with:
     - **Zinc** (15–30 mg/day), **seleniumvitamin CB12folate**
     - **Medicinal mushrooms**: reishi, turkey tail, cordyceps
     - **Propolis**,**echinacea beta-glucans** – gentle immune stimulation
     - **Glutathione or NAC** – to protect lymphocyte DNA and support recovery
3. **Lower Chronic Stress + Cortisol (The Lymphocyte Suppressor)**
   - Cortisol **raises neutrophils and suppresses lymphocytes**—a key driver of elevated NLR.
     - Parasympathetic tools:
       - **Breathworkmeditationvagal nerve activation**
       - **Adaptogens**: ashwagandha, rhodiola, holy basil
       - **Magnesium threonatephosphatidylserineL-theanine**
       - Optimize **sleep**, since poor sleep dysregulates both neutrophils and lymphocytes.
4. **Address Hidden Infections or Inflammatory Triggers**
   - Elevated NLR can indicate:
     - **Chronic infections** (viral, bacterial, dental, gut)
     - **Toxins** (mold, heavy metals)
     - **Autoimmune flare** or **low-grade inflammation**
   - Test if needed:
     - **CRP**,**homocysteine ferritin** (inflammation)
     - **Stool test** (gut dysbiosis or infection)
     - **Viral titers** (EBV, CMV, etc.)
     - **Mold/mycotoxins** if environmental exposure is suspected
5. **Follow an Anti-Inflammatory, Immune-Supportive Diet**
   - Focus on:
     - **Wild salmon**, **sardines**, EVOO, avocados
     - **Colorful plants**, **leafy greens**, cruciferous veggies
     - **Herbs + spices**: turmeric, ginger, rosemary, garlic
     - **Berries**, nuts/seeds, green tea
   - Avoid:
     - Processed carbs, sugar, seed oils, alcohol, dairy (if reactive)

Summary Protocol for Elevated NLR:

- Take **LivinGene Cell Shield and Cell Defense**
- Lower neutrophil inflammation with omega-3s, curcumin, green tea extract
- Support lymphocyte strength with zinc, C, medicinal mushrooms, and glutathione
- Reduce chronic stress and cortisol to restore immune balance
- Optimize sleep, vagal tone, and recovery
- Eat an anti-inflammatory, immune-supportive diet
- Investigate hidden infections or chronic inflammation if NLR remains high

Optimal

Systemic Immune-Inflammation Index (Systemic Immune-Inflammation Index (SII) is a composite marker calculated as (Platelet count x Neutrophil count) / Lymphocyte count. High levels are linked to systemic inflammation, poor prognosis in cancer, and cardiovascular risk, while low levels may indicate immune suppression or reduced inflammatory response.

Deficient

White Blood Cell Count (WBC) are essential for fighting infection and maintaining immune defense.

- **High WBC levels** may indicate infection, stress, or inflammation.
- **Low WBC levels** may signal immune suppression, nutrient deficiencies, or chronic illness.
- **Improve Naturally:**
  - Eat foods rich in vitamin C (kiwi, bell peppers) and zinc (pumpkin seeds).
  - Prioritize gut health with probiotics (yogurt, sauerkraut). Engage in regular exercise to boost immune function and avoid excessive alcohol and smoking, both of which can impair WBC levels.

Cognitive Health **Profile**

A Cognitive Health Profile evaluates key aspects of cognitive function, including memory, reasoning, language proficiency, and processing speed. This assessment provides a comprehensive understanding of overall brain health and highlights potential areas of cognitive decline or impairment.

Elevated

Dopamine Metabolites are byproducts of dopamine breakdown (e.g., Homovanillic Acid or HVA). They reflect dopamine activity in the brain and nervous system. Imbalances can signal issues with mood, focus, and motivation. Elevated dopamine metabolites, especially Dopamine 3-O-sulfate (DA-SO4), typically means the body is producing and/or degrading dopamine rapidly, under stress, overstimulated, or burning through dopamine reserves, possibly facing oxidative stress, poor methylation, or detox congestion and showing signs of neurotransmitter imbalance (especially with norepinephrine / epinephrine).

- This often shows up in people who are:
  - Type-A, driven, always "on"
  - Using lots of caffeine or stimulants
  - Burning out mentally or emotionally
  - Dealing with **neuroinflammation**, **gut issues**, or **detox overload**
- **1. Balance Dopamine Production + Clearance**
  - High dopamine metabolite = overproduction OR poor processing.
  - Support dopamine balance:
    - **L-tyrosine** (only if dopamine is low AND you need it)
    - **Avoid excess stimulants**: caffeine, Adderall, nicotine, pre-workouts
    - **Vitamin B6 (P5P)** and **B2 (riboflavin)** – co-factors for dopamine metabolism
    - **Zinc** – essential for neurotransmitter regulation
    - **Magnesium** – calms dopaminergic overactivity
  - Watch for:
    - Caffeine overload
    - Constant goal-chasing without rest
    - "Wired but tired" feeling
- **2. Support COMT and MAO Enzymes (Neurotransmitter Clearance Pathways)**
  - Dopamine 3-O-sulfate builds up when **COMT (catechol-O-methyltransferase)** and **MAO (monoamine oxidase)** aren't functioning efficiently.
    - Boost detox of catecholamines:
      - **Magnesiummethylated B12**5-MTHFSAMe – COMT cofactors
      - **Vitamin C** – supports MAO + adrenal health
      - **CholineTMG (trimethylglycine)** – help clear dopamine breakdown products
      - **Liver support herbs** : dandelion, artichoke, milk thistle, take**LivinGene Cell Detox**
    - Optional: Consider **COMT genetic testing** if this pattern is chronic
- **3. Reduce Neuroinflammation + Oxidative Stress**
  - Excess dopamine metabolism creates **free radicals** and **oxidative damage** in the brain.
    - Use brain antioxidants:
      - Take **LivinGene Cell Shield**
      - **NACglutathionealpha-lipoic acid (ALA)**
      - **CurcuminresveratrolEGCG (green tea extract)**
      - **Astaxanthin** – crosses the blood-brain barrier
      - **Omega-3s (DHA)** – supports membrane integrity
- **4. Restore Parasympathetic Tone + Calm Brain Overdrive**
  - Excess dopamine breakdown often reflects **nervous system hyperarousal**.
    - Reset daily:
      - **Heart-rate variability breathwork** (breathe in 4, out 6 seconds)
      - **YogaTai Chigrounding in nature**
      - **L-theanine,phosphatidylserine ashwagandha**
      - **Blue light blocking + early bedtime**
- **5. Check the Gut-Brain Connection**
  - The gut helps regulate neurotransmitter balance (and clears used metabolites via bile and stool).
    - Gut reset:
      - **Probiotics** (especially *Lactobacillus plantarum*/*rhamnosus*)
      - **Prebiotic fiber**: acacia, PHGG, flax
      - **Castor oil packs** or **bitter herbs** for bile flow
      - **Reduce gut inflammation** (sugar, gluten, additives)
- **Optional Testing (If Needed):**
  - **Organic Acids Test (OAT)** – shows dopamine, norepinephrine, serotonin metabolites
  - **COMT and MAO gene variants**
  - **Methylation markers** (homocysteine, B12, folate levels)
  - **Neuroinflammation or gut permeability tests**
- **Summary Protocol for Elevated Dopamine 3-O-Sulfate:**
  - Start with **LivinGene Cell Detox**, **Cell Shield** and **Cell Renewal**
  - Reduce overstimulation (caffeine, stress, stimulants) and balance dopamine output
  - Support COMT + MAO with magnesium, methylated B vitamins, choline, and SAMe
  - Use antioxidants like glutathione, NAC, curcumin, and omega-3s to protect the brain
  - Activate parasympathetic state with breathwork, nature, and calming herbs
  - Heal the gut and support detox of dopamine metabolites via fiber, bile, and probiotics
  - Test deeper if patterns persist (OAT, methylation, COMT genetics)

Elevated

Neurogranin is a protein concentrated in the postsynaptic regions of neurons. It plays a crucial role in learning, memory, and plasticity. When it's elevated, it likely means neuronal damage or synaptic pruning is happening faster than the brain can repair. Elevated Neurogranin in the body, especially in cerebrospinal fluid or blood tests, is a potential early warning sign of:

- **Synaptic dysfunction** (the space between brain cells where communication happens)
- **Early-stage Alzheimer's or cognitive decline**
- **Chronic stress or trauma impacting brain plasticity**
- **Excitotoxicity** (overactivation of brain receptors by glutamate)
- **Oxidative stress and neuroinflammation**

1. Reduce Excitotoxicity and Calm Overactive Brain Signaling

- High neurogranin is often tied to **excess glutamate activity** and **low GABA**.
  - Calm the brain:
    - **Magnesium threonate** – crosses blood-brain barrier, reduces excitability
    - **L-theanine**, **GABA**, **taurineglycine** – enhance calming neurotransmitters
    - **Lion's mane mushroom** – promotes NGF (nerve growth factor)
    - **Avoid excess glutamate** from MSG, aspartame, and ultra-processed foods

2. Boost Mitochondrial + Synaptic Energy

- Synaptic repair is **energy-intensive**. Poor mitochondrial function leads to breakdown.
  - Support mitochondrial energy:
    - Take**LivinGene Cell Renewal**
    - **CoQ10 (ubiquinol)**
    - **PQQ** – stimulates mitochondrial biogenesis
    - **Alpha-lipoic acid (ALA)**
    - **Acetyl-L-carnitine** – fuels brain cell metabolism
    - **NAD+ boostersNMN** or **NR**, especially with **resveratrol** or **quercetin**

3. Lower Neuroinflammation and Oxidative Stress

- Inflammation and ROS accelerate synaptic damage and raise neurogranin.
  - Use:
    - **LivinGene Cell Shield**
    - **Curcuminresveratrolgreen tea extractEGC**
    - **Astaxanthin glutathione**, or **NAC** for brain antioxidant protection
    - **Omega-3s (especially DHA)** – key for synaptic membrane health
    - **Vitamin D3 + K2** – neuroprotective and immune balancing

4. Support Brain Detox + Glymphatic Clearance

- Neurogranin may accumulate if the**brain's waste-removal system is sluggish**.
  - Activate glymphatic flow:
    - **Sleep on your side** (best for brain drainage)
    - **7–9 hours deep sleep** – especially early night sleep (10 PM–2 AM)
    - **Manual lymphatic drainagecastor oil packscraniosacral therapy**
    - **Hydration + electrolytes** (especially first thing in the morning)

5. Lower Psychological + Neuro-Emotional Stress

- Chronic emotional trauma and cortisol spikes can cause **synaptic loss** and increase **neurogranin expression**.
  - Reset brain-nervous system tone:
    - **Heart coherence breathwork (HRV training)**
    - **EMDRtappingsomatic therapy** – for trauma patterns
    - **Adaptogens**: rhodiola, ashwagandha, holy basil
    - **Sunlightgroundingforest bathing** – calm the limbic system

6. Enhance Neuroplasticity + Cognitive Reserve

- Give the brain **stimulation and novelty** to rebuild synapses.
  - Brain-activating practices:
    - **Learn something new** (language, instrument, dance, puzzles)
    - **Cross-crawl movementshand-switching activities**
    - **Neurofeedback or brainwave entrainment**
    - **Cold exposure + sauna alternation** – improve BDNF and brain resilience

Optional Testing:

- If neurogranin stays elevated or is part of a neurodegenerative profile:
  - **Homocysteine** (inflammation + methylation marker)
  - **ApoE genotype** (brain lipid transport)
  - **hs-CRP**, **IL-6TNF-alpha** (inflammatory cytokines)
  - **Organic acids test** (brain mitochondrial stress, neurotransmitter balance)

Summary Protocol for Elevated Neurogranin:

- Start with **LivinGene Cell Detox, Cell Shield and Cell Renewal**
- Calm excitotoxicity with magnesium threonate, GABA, and theanine
- Fuel synaptic repair with CoQ10, PQQ, ALA, and NAD+ boosters
- Lower brain inflammation with DHA, curcumin, and glutathione
- Activate glymphatic detox with side sleeping, deep sleep, hydration
- Reduce emotional and limbic stress with breathwork, adaptogens, and grounding
- Stimulate new brain growth with novelty, movement, and neuroplastic practices
- Consider functional testing for deeper brain and mitochondrial insight

Optimal

Progranulin Progranulin is a protein involved in wound healing, inflammation, and neurodegeneration. Elevated levels may reflect active inflammation or tissue repair, while low levels could indicate impaired healing processes or an increased risk of neurodegenerative conditions.

Elevated

Quinolinate (Quinolinic Acid) is a neurotoxic byproduct of the kynurenine pathway, linked to excessive inflammation, oxidative stress, and neurological damage. Elevated Quinolinate (Quinolinic Acid) is VERY important because it signals neuroinflammation, glutamate excitotoxicity, and potential brain damage risk if not addressed. It's a powerful NMDA receptor agonist, meaning it overstimulates neurons, leading to brain inflammation, oxidative stress, synaptic loss, mood disorders (depression, anxiety) and neurodegeneration risk (Alzheimer's, MS, Parkinson's).

- In short:
  - **High Quinolinate = The brain is inflamed, stressed, and overexcited.**
- **1. Calm the Glutamate Storm (Reduce Excitotoxicity)**
  - Use:
    - **Magnesium threonate** (specifically crosses blood-brain barrier)
    - **L-theanine,GABA taurine** – enhance inhibitory neurotransmitters
    - **Apigenin** (from chamomile) – natural NMDA modulator
    - **N-acetylcysteine (NAC)** – protects neurons from glutamate-induced oxidative stress
  - Avoid:
    - MSG, aspartame, ultra-processed foods (hidden glutamate sources)
    - Chronic caffeine overload (worsens excitotoxicity)
- **2. Shift Tryptophan Metabolism Away from the Kynurenine Pathway**
  - When inflammation is high, tryptophan gets diverted to **quinolinate** instead of **serotonin**.
    - Strategies:
      - **Reduce systemic inflammation** (curcumin, resveratrol, green tea extract)
      - **Support serotonin production** (tryptophan, 5-HTP cautiously if needed)
      - **Boost vitamin B2 (riboflavin) and B6 (pyridoxal-5-phosphate)** — key cofactors for healthy tryptophan metabolism
      - **Zinc** and **magnesium** to rebalance inflammatory pathways
- **3. Lower Neuroinflammation and Oxidative Stress**
  - Anti-inflammatory essentials:
    - **High-dose Omega-3s (EPA/DHA)** – brain-specific anti-inflammatory effect, take **LivinGene Cell Shield**
    - **Astaxanthincurcumingreen tea EGCGresveratrol** — calm brain inflammation
    - **Glutathione support** (liposomal glutathione or NAC)
- **4. Prioritize Deep Sleep for Brain Detox**
  - During sleep, the **glymphatic system** flushes out metabolic waste like quinolinate.
    - Sleep upgrade:
      - Sleep **7–9 hrs** minimum, consistent schedule
      - Sleep on your **side** (best for brain drainage)
      - Use **magnesium glycine theanine** at night for deeper sleep
      - Blue light blockers after sunset
- **5. Calm the Nervous System and Reduce Cortisol**
  - Cortisol stimulates **IDO enzyme**, which drives tryptophan toward **quinolinate**.
    - Stress reset:
      - **Vagus nerve toning** (humming, cold exposure, deep breathing)
      - **Adaptogens**: ashwagandha, holy basil, rhodiola
      - **Meditationnature immersiongratitude practice**
- **6. Address Hidden Infections or Immune Triggers**
  - Chronic infections (like Lyme, mold, viruses) **increase quinolinate production**.
    - If signs are present, test for:
      - Viral reactivations (EBV, CMV)
      - Lyme disease, co-infections
      - Mold/mycotoxin exposure
      - GI pathogens (gut infections upregulate inflammation → quinolinate)
    - **Optional Testing:**
      - **Organic Acids Test (OAT)** – tracks quinolinate, kynurenine, and oxidative stress
      - **CRP, IL-6, TNF-alpha** – systemic inflammation markers
      - **Neurotransmitter panels** (dopamine, serotonin, GABA balance)
      - **Nutrient panels** (zinc, magnesium, B6, glutathione status)
- **Summary Protocol for Elevated Quinolinate:**
  - Take **LivinGene Cell Detox, Cell Shield and Cell Renewal**
  - Calm glutamate excitotoxicity with magnesium threonate, GABA, and taurine
  - Shift tryptophan away from the kynurenine pathway with B2, B6, zinc, and inflammation reduction
  - Flood the brain with antioxidants: omega-3s, glutathione, curcumin, resveratrol
  - Prioritize deep, high-quality sleep and glymphatic detox at night
  - Reset stress + cortisol levels daily through breathing, adaptogens, and vagal toning

- Rule out hidden infections if symptoms are chronic or severe
- Support serotonin gently if needed with cofactors or 5-HTP (cautiously)

Elevated

Elevated TGF-β (Transforming Growth Factor Beta) is critical to understand because it shows deep, chronic inflammation and fibrosis potential—two processes that drive aging, autoimmune conditions, organ dysfunction, and even cancer risk if left unchecked. TGF-β is a double-edged sword that protects against acute injury (promotes healing), but when chronically elevated, causes fibrosis (scarring of tissues: liver, lungs, kidneys, heart), immune suppression + immune dysregulation, chronic inflammation, and autoimmune activation, tissue remodeling that accelerates aging and disease.

- Conditions linked to high TGF-β:
  - **Mold/mycotoxin exposure**
  - **Chronic Lyme/co-infections**
  - **Fibrosis disorders** (lung, liver, kidney)
  - **Autoimmune diseases**
  - **Long COVID and post-viral syndromes**
  - **Some cancers** (pro-cancerous microenvironment)
- 1. Stop the Source of Chronic Injury or Irritation
  - TGF-β responds to cellular injury. You must remove ongoing insults.
    - Investigate and treat:
      - **Mold/mycotoxin exposure** (highly common with high TGF-β)
      - **Persistent infections** (Lyme, EBV, CMV)
      - **Environmental toxins** (heavy metals, plastics, chemicals)
      - **Gut permeability and microbiome dysbiosis**
    - Testing if needed: Mycotoxin panel, GI-MAP, heavy metal testing
- 2. Lower Inflammation and Fibrosis Signaling
  - TGF-β is a profibrotic and proinflammatory cytokine.
    - You must lower both inflammation and collagen scarring.
    - Anti-fibrotic + anti-inflammatory nutrients:
      - Take LivinGene Cell Shield
      - **Curcumin (bioavailable)** – downregulates TGF-β expression
      - **Green tea extract (EGCG)** – powerful TGF-β modulator
      - **Resveratrol, quercetin, luteolin** – anti-inflammatory flavonoids
      - **Omega-3s (high-dose EPA/DHA)** – reduce fibrosis signaling
      - **Vitamin D3/K2** – immunomodulator (optimize levels ~60 ng/mL)
- 3. Support ECM (Extracellular Matrix) Repair + Remodeling
  - TGF-β controls the extracellular matrix. Balance is needed to prevent scarring.
    - Matrix-support nutrients:
      - **N-acetylcysteine (NAC)** – breaks down excessive fibrosis and oxidative stress
      - **Glutathione** (liposomal) – antioxidant shield
      - **Collagen peptides + vitamin C** – healthy matrix remodeling
      - **Magnesium** – critical for matrix enzymes (MMPs)
- 4. Calm the Nervous System + Lower Cortisol
  - Chronic stress **upregulates TGF-β** through cortisol and inflammatory loops.
    - Calm practices:
      - **HRV training, breathwork, yoga, grounding**
      - **Adaptogens**: ashwagandha, holy basil, rhodiola
      - **Morning sunlight exposure + circadian optimization**
      - **Sleep deeply** (7–9 hours) for brain and immune reset
- 5. Activate Gentle Detoxification Pathways
  - Clearing cellular debris lowers the triggers for TGF-β overproduction.
    - Detox support:
      - **Bitter herbs**: dandelion, gentian, milk thistle
      - **Binders** (if mold or toxins present): activated charcoal, bentonite clay, chlorella
      - **Infrared sauna, castor oil packs, dry brushing** – to support lymphatic flow
- **Optional Deeper Testing:**
  - If you want to target therapies precisely:
    - **TGF-β blood levels** (repeat monitoring)
    - **Mold/mycotoxin panels**
    - **GI stool analysis** (inflammation + pathogens)
    - **Oxidative stress markers (8-OHdG, lipid peroxides)**
    - **Fibrosis markers** (TIMP-1, MMP-9 if available)
- **Summary Protocol for Elevated TGF-Beta:**
  - Start with **LivinGene Cell Detox and Cell Shield**
  - Remove the source of chronic irritation (mold, infections, toxins)
  - Lower inflammation and fibrosis signaling with curcumin, green tea, omega-3s
  - Support matrix remodeling with NAC, glutathione, collagen, and vitamin C
  - Calm the nervous system and cortisol output through breathwork, adaptogens, and circadian healing
  - Enhance detox pathways gently with bitters, binders, lymphatic movement
  - Test if needed to monitor inflammation, toxins, infections, and matrix health

Inflammatory Response **Insights**

Inflammatory Response refers to the immune system's ability to identify and eliminate harmful stimuli while initiating the body's natural healing processes. Serving as a critical defense mechanism, it protects against internal and external threats.

Deficient

C-Reactive Protein (CRP) is a key marker of inflammation in the body. Elevated levels may indicate chronic inflammation, infection, or cardiovascular risk.

- **Improve Naturally:** Prioritize anti-inflammatory foods like turmeric, ginger, and green leafy vegetables. Increase omega-3s (salmon, flaxseeds) to reduce inflammation and take LivinGene's Cell Shield supplement. Manage stress through meditation or breathing exercises. Regular exercise helps lower CRP over time.

Optimal

Glycoprotein Acetyls (GlycA)

Glycoprotein acetyls (GlycA) are inflammatory biomarkers representing glycosylated acute-phase proteins in the bloodstream. Elevated GlycA levels are associated with systemic inflammation, increased cardiovascular disease risk, and poorer metabolic health, making it a key marker for assessing longevity and chronic disease burden.

Optimal

Interleukin-6 (IL-6)

IL-6 (Interleukin-6) is a cytokine involved in inflammation and the immune response.

Elevated

Methionine Sulfone is a naturally occurring oxidation product of the amino acid methionine. It may form in the body as a result of oxidative processes and is primarily linked to the intake of methionine-rich foods. Methionine sulfone forms when methionine is over-oxidized by reactive oxygen species (ROS) like hydrogen peroxide and superoxide. It's a marker of oxidative stress, cellular wear and tear, mitochondrial dysfunction, and even accelerated biological aging. Elevated Methionine Sulfone is a very important marker because it signals oxidative damage at the amino acid level, especially damage to methionine, which is a critical methyl donor and antioxidant defender in the body. It's closely related to damage seen in neurodegeneration, heart disease, diabetes, and cancer if left unchecked.

- **In short:**
  - High Methionine Sulfone = your antioxidant defenses are overwhelmed.
- **1. Flood the Body with Antioxidants to Neutralize ROS**
  - You need to **stop the oxidative attack** at the root.
    - Core antioxidant support:
      - **Glutathione** (liposomal) or **NAC** – master antioxidant defense
      - **Vitamin C** (buffered, high dose) – quenches free radicals
      - **Astaxanthin and Delta Tocotrienols** – mitochondrial antioxidant protection
      - **CoQ10 (ubiquinol form)** – essential for electron transport chain stability
      - **Alpha-lipoic acid (ALA)** – bridges fat- and water-soluble antioxidant systems
- **2. Supercharge Mitochondrial Function**
  - Mitochondria are the main source of ROS when they're stressed.
    - Mitochondria repair nutrients:
      - Take **LivinGene Cell Shield and Cell Renewal**
      - **PQQ** – stimulates mitochondrial biogenesis
      - **Acetyl-L-carnitine** – shuttles fatty acids into mitochondria
      - **Magnesium** – critical for mitochondrial enzymes
      - **Omega-3 DHA/EPA** – stabilize mitochondrial membranes
      - **B2 (riboflavin)** and **B3 (niacin/NAD+)** – electron transport chain cofactors
- **3. Lower Systemic Inflammation** and feeds into methionine oxidation.
  - Chronic inflammation amplifies oxidative stress.
    - Anti-inflammatory support:
      - **Curcuminresveratrolgreen tea EGCGboswellia**
      - **Omega-3s: take LivinGene Cell Shield**
      - **Vitamin D3/K2** – optimize immune modulation
    - Remove:
      - Seed oils (canola, soybean, corn)

- Sugar and processed foods
- Environmental toxins (plastics, heavy metals if applicable)

4. **Support Methylation and Methionine Recycling**
   - Methionine is critical for **methylation cycles** — if it's oxidized, methylation suffers.
     - Methylation support:
       - **Methylated B12 (methylcobalamin)**
       - **Methylated folate (5-MTHF)**
       - **Betaine (TMG)**
       - **SAMe** (optional, if extra methylation needed)
5. **Calm the Nervous System + Lower Stress**
   - Chronic stress increases **cortisol**, which increases **oxidative load**.
     - Nervous system reset:
       - Breathwork, yoga, meditation, forest bathing
       - **Ashwagandhaholy basiltheanine**
       - **Morning sunlight exposure** to balance circadian rhythm
       - **Cold exposure** to activate antioxidant pathways (hormesis)
6. **Prioritize Sleep for Oxidative Repair**
   - Deep sleep is the body's time to **clear ROS and repair oxidized proteins**.
     - Sleep support:
       - **7–9 hrs deep sleep** per night
       - **Glycinemagnesium threonatetheanine** – to enhance restorative sleep
       - **Low blue light exposure** after sunset to support melatonin (natural antioxidant)

Optional Testing (If Needed):

- If oxidative stress persists:
  - **8-OHdG** (DNA oxidative damage marker)
  - **Lipid peroxides** (lipid oxidation markers)
  - **Organic Acids Test (OAT)**– mitochondrial + oxidative status
  - **Glutathione levels** (RBC or serum)

Summary Protocol for Elevated Methionine Sulfone:

- Start with **LivinGene Cell Detox, Cell Shield and Cell Renewal**
- Replenish antioxidant defenses with glutathione, NAC, vitamin C, CoQ10, astaxanthin
- Repair mitochondria with PQQ, carnitine, magnesium, omega-3s, and NAD+ boosters
- Lower systemic inflammation with curcumin, omega-3s, green tea, and vitamin D3
- Support methylation pathways with B12, folate, betaine, and possibly SAMe Calm the
- nervous system daily to lower cortisol and oxidative output Prioritize deep sleep and
- circadian rhythm healing Consider deeper oxidative stress and mitochondrial testing if
- needed

Optimal

Serum Amyloid A-1 Protein

Serum Amyloid A-1 Protein is an acute-phase protein involved in inflammation and immune response. Elevated levels may indicate active inflammation, while low levels could reflect a lack of inflammatory activity.

Stress Resilience & Environmental Exposure **Analysis**

Stress Resilience refers to your capacity to adapt to and recover from challenging circumstances or stressors, whether arising internally or externally, such as trauma or adversity. Environmental Exposure encompasses your interaction with potentially harmful substances present in air, water, food, or soil. Assessing these factors provides critical insights into strategies for minimizing risk and optimizing daily habits for improved health and well-being.

Elevated

Acrolein is a toxic byproduct formed from burning organic materials like tobacco smoke, vehicle exhaust, and overheated cooking oils. Elevated acrolein levels are linked to oxidative stress, inflammation, and increased cardiovascular risk. Acrolein is a lipid-damaging toxin found in tobacco smoke (active + passive), car exhaust and air pollution, burned cooking oils (especially seed oils), plastics, varnishes, industrial fumes, certain chemotherapy drugs and indoor air sources (candles, incense).

- **1. Eliminate the Source**
  - Remove:
    - All exposure to **cigarette smoke** (even occasional or secondhand)
    - Avoid **burned foods**, grilled meats, and reheated vegetable oils
    - Stop using **canola/soy/sunflower oils** – switch to **avocado, ghee, olive oil**
    - Minimize indoor air pollutants: scented candles, air fresheners, incense
  - Upgrade air quality:
    - Use a **HEPA air purifier** (especially in bedroom + kitchen)
    - Open windows daily or ventilate with filtered airflow
    - Use **nasal saline spray** or neti pot after urban exposure
- **2. Replenish Glutathione + Antioxidant Defenses**
  - Acrolein depletes **glutathione**, your #1 cellular defense molecule.
    - Replenish with:
      - **NAC (N-acetyl cysteine)** – 600–1200 mg/day
      - **Liposomal glutathione** – direct, fast-acting support
      - **Alpha-lipoic acid (ALA)** – regenerates glutathione + protects mitochondria
      - **Selenium** – cofactor for glutathione peroxidase
      - **Vitamin C (buffered)** – antioxidant + glutathione sparing
- **3. Protect Cell Membranes + Mitochondria**
  - Acrolein attacks phospholipids and mitochondria.
    - Key protectors:
      - Take **LivinGene Cell Shield**
      - **CoQ10 (ubiquinol)** – mitochondrial shield + energy support
      - **Phosphatidylcholine (PC)** – repairs damaged cell membranes
      - **Astaxanthin** – **Tocotrienols** – antioxidant for lipid-rich brain + lungs
      - **Omega-3s (DHA/EPA)** – reduces inflammation and membrane oxidation
- **4. Support Liver Detoxification + Elimination**
  - Liver + bile flow support:
    - Take **LivinGene Cell Detox**
    - **Milk thistle**, **dandelion root**, **artichoke leaf**
    - **Glutathione precursors** (NAC, glycine, selenium)
    - **Castor oil packs** – promote liver lymphatic flow
    - Ensure **daily bowel movements** (add psyllium or magnesium citrate if needed)
- **5. Support Lung Repair + Inflammation Control**
  - Lung-healing nutrients:
    - **NAC + glutathione** – breaks down mucus, protects alveoli
    - **Cordyceps mushroom** – lung + oxygenation support
    - **Quercetin + bromelain** – anti-inflammatory, stabilizes mast cells
    - **Hibiscus tea + nettles** – soothe respiratory inflammation
- **6. Eat an Antioxidant-Rich, Detox-Supportive Diet**
  - Focus on:
    - Cruciferous veggies (broccoli, kale, cabbage – rich in sulforaphane)
    - Garlic + onions (rich in sulfur compounds for phase II detox)
    - Beets, cilantro, parsley, turmeric
    - Berries, pomegranate, wild greens
    - Chlorella or spirulina (binds pollutants + supports detox)
- **7. Sweat + Hydrate Daily**
  - Acrolein is excreted via **urine and sweat**.
    - Detox support:
      - **Infrared sauna**, **hot baths**, or exercise-induced sweating
      - 2.5–3 liters/day of clean, filtered water
      - Add electrolytes or lemon/sea salt for mineral support

Optional Testing:

- **Repeat HPMA (urinary acrolein) test** after 4–6 weeks
- **Glutathione (GSH) status**, **oxidative stress panel**
- **hs-CRP, IL-6, GlycA** – if inflammation is persistent
- **Environmental Toxin Profile** (Vibrant or Great Plains) if broader exposure is suspected

Summary: How to Detox Acrolein (HPMA) Naturally

- Take **LivinGene Cell Detox** and **Cell Shield**
- Remove exposure to smoke, burned food, and polluted air
- Rebuild glutathione with NAC, ALA, selenium, and liposomal GSH

- Protect mitochondria with CoQ10, PC, and omega-3s
- Support liver and bile flow with milk thistle, castor packs, and hydration
- Heal lungs with cordyceps, quercetin, NAC, and herbs
- Eat a high-antioxidant, sulfur-rich, and fiber-filled diet
- Sweat and hydrate to flush toxins out of the body

Elevated

Cortisol is the body's primary stress hormone, released by the adrenal glands. It regulates metabolism, immune response, and blood pressure. Elevated cortisol is one of the most common and most damaging imbalances in today's world and it's *sneaky* because people often feel "fine" at first (more wired, productive)... until burnout, inflammation, immune dysfunction, weight gain, sleep issues, blood sugar crashes, and brain fog start kicking in.

- Chronically high cortisol can cause:
  - **Immune suppression** (getting sick easily or chronic infections)
  - **Insulin resistance** (weight gain, blood sugar instability)
  - **Brain fog and memory loss** (especially hippocampal damage)
  - **Leaky gut and digestive issues**
  - **Hormonal imbalances** (thyroid, estrogen/progesterone)
  - **Poor sleep and circadian rhythm disruption**
  - **Mood swings, anxiety, depression**
- **1. Activate the Parasympathetic Nervous System (Calm Mode)**
  - Chronic sympathetic ("fight-or-flight") dominance = chronic cortisol production.
    - Daily calming practices:
      - **Breathwork** (e.g., 4-7-8 breathing or box breathing)
      - **Yoga****tai chi** or **Qi Gong** (movement + calm = magic)
      - **Meditation or prayer** (even 5 min/day resets cortisol)
      - **Grounding** (barefoot walking in nature)
      - **Vagus nerve stimulation** (cold exposure, humming, gargling)
- **2. Reset the Circadian Rhythm (Master Cortisol Controller)**
  - Cortisol should be **highest in the morning****lowest at night**. Fixing light signals is essential.
    - Circadian reset:
      - **Morning sunlight** within 30 minutes of waking
      - **No blue light** 2 hours before bed (use blue-light blocking glasses if needed)
      - **Consistent sleep-wake times**, even weekends
      - **Early dinner** (3 hours before bed) to stabilize blood sugar overnight
- **3. Use Adaptogens to Balance Cortisol (Not Suppress It)**
  - Adaptogens help **smooth out cortisol levels** — not push them too low.
    - Best adaptogens:
      - **Ashwagandha** – calming, cortisol-lowering
      - **Rhodiola rosea** – energizing but regulatory (morning use only)
      - **Holy basil (Tulsi)** – balances stress response gently
      - **Schisandra** – liver support + stress resilience
- **4. Stabilize Blood Sugar to Calm Cortisol Surges**
  - Blood sugar crashes trigger emergency cortisol release.
  - Keeping blood sugar stable = less cortisol overreaction.
    - Blood sugar stability:
      - **Protein + healthy fat** at every meal
      - **Avoid refined sugars and simple carbs**
      - **Small, regular meals** if hypoglycemia symptoms occur
      - **Cinnamon****chromium****berberine** – natural insulin sensitizers
- **5. Lower Inflammation and Oxidative Stress**
  - Inflammation = cortisol trigger. Lowering background inflammation calms cortisol production.
    - Anti-inflammatory essentials:
      - Take LivinGene **Cell Shield**
      - **Omega-3s (EPA/DHA)**
      - **Curcumin****resveratrol****green tea extract**
      - **Vitamin D3/K2** (optimize levels around 50–70 ng/mL)
- **6. Prioritize Deep Sleep (When Cortisol Resets)**
  - Bad sleep = cortisol spike = vicious cycle.
    - Sleep support:
      - **7–9 hours** of consistent, high-quality sleep
      - **Magnesium glycinate****glycine****L-theanine****phosphatidylserine** (calming brain nutrients)
      - **Dark, cool room** (65–68°F ideal)
      - **No screens 1 hour before bed**
- **Optional Functional Testing:**
  - If needed to monitor and target therapy:
    - 4-point salivary cortisol or **DUTCH Adrenal Panel** (best test for true patterns)
    - **Fasting insulin****HbA1c** (insulin resistance markers)
    - **hs-CRP****IL-6** (inflammatory markers)
- **Summary Protocol for Elevated Cortisol:**
  - Take LivinGene **Cell Shield**
  - Activate the parasympathetic system daily with breathwork, grounding, and vagal nerve work.
  - Reset the circadian rhythm with morning sunlight, early dinners, and blue light avoidance.
  - Use adaptogens like ashwagandha, rhodiola, and holy basil to gently balance cortisol.
  - Stabilize blood sugar with protein, healthy fats, cinnamon, and blood sugar balancing herbs.
  - Lower inflammation naturally with omega-3s, curcumin, green tea extract, and vitamin D.

- Prioritize deep, consistent sleep for full-body repair and cortisol normalization
- Test cortisol rhythm and inflammatory markers if needed

Critical (High)

Kynurenine is a major metabolite produced when tryptophan is broken down through the Kynurenine pathway. Instead of making serotonin. Elevated Kynurenine is a huge clue that the body is under inflammation-driven metabolic pressure. When inflammation is high (especially IL-6, TNF-alpha, interferon-gamma), an enzyme called IDO (indoleamine 2,3-dioxygenase) is activated, and it shunts tryptophan kynurenine. Elevated Kynurenine indicates chronic inflammation or immune activation, low serotonin production (tryptophan is being diverted), oxidative stress and mitochondrial dysfunction, neuroinflammation and brain fog/mood imbalance and potential autoimmune diseases, long COVID, cancer, depression.

- In simple words:
  - **Kynurenine = inflammation stealing your happiness molecules.**
- **1. Lower Systemic Inflammation (Stop the IDO Activation)**
  - The #1 cause of elevated kynurenine is **immune activation**.
    - Natural anti-inflammatory tools:
      - **Curcuminresveratrolgreen tea EGCG**
      - **Omega-3s (EPA/DHA)** – high dose; take **LivinGene Cell Shield**
      - **Vitamin D3/K2** (optimize levels ~50–70 ng/mL)
      - **Quercetinboswellia serrata** – excellent cytokine modulators
    - Eliminate inflammatory triggers:
      - Processed foods, sugars, seed oils
      - Mold, chronic infections, toxins if present
- **2. Protect the Brain Against Neuroinflammation**
  - Elevated kynurenine downstream toxic metabolites (like quinolinate) brain fog, depression, memory issues.
    - Brain protectors:
      - **Glutathione** (liposomal or NAC)
      - **Astaxanthinalpha-lipoic acid (ALA), DHA**
      - **Magnesium threonate** – brain-calming
      - **Lion's mane mushroom** – supports neurogenesis
- **3. Shift Tryptophan Back Toward Serotonin**
  - We want to **favor serotonin production**, not kynurenine.
    - How:
      - **Methylated B vitamins** (B2, B6, B12, 5-MTHF) – needed for tryptophan metabolism
      - **SAMe** (S-adenosylmethionine) – helps support methylation
      - **Tryptophan-rich foods** (wild turkey, salmon, pumpkin seeds) combined with **anti-inflammatory diet**
      - **Short-term 5-HTP supplementation** (optional, with practitioner guidance)
- **4. Reset Circadian Rhythm**
  - Melatonin and serotonin are linked. Poor circadian health = poor serotonin → more kynurenine.
    - Circadian optimization:
      - **Morning sunlight** within 30 mins of waking
      - **No blue light** 2 hrs before bed
      - **Consistent sleep schedule** (sleep 10 PM–6 AM if possible)
- **5. Lower Stress and Calm the Nervous System**
  - Stress (via cortisol) **upregulates IDO enzyme**, pushing tryptophan → kynurenine.
    - Nervous system healing:
      - Daily **breathwork, grounding, HRV training**
      - **Ashwagandhaholy basiltheanine** – for calming
      - Gentle movement: yoga, tai chi, forest walks
      - Emotional healing practices: journaling, therapy, trauma release work
- **6. Prioritize Restorative Sleep**
  - Sleep is when the body **resets inflammatory pathways** and **rebalances neurotransmitters**.
    - Sleep rituals:
      - **Magnesium glycinateglycinetheanine**
      - **Dark, cool sleeping environment**
      - Sleep minimum **7–9 hours per night**
- **Optional Testing:**
  - If kynurenine remains high, or deeper dysfunction is suspected:
    - **Organic Acids Test (OAT)** – tracks tryptophan metabolites
    - **Inflammation markers**: CRP, IL-6, TNF-alpha
    - **Methylation panels**: B12, folate, homocysteine
    - **Mold/mycotoxin panels** if suspect environmental triggers
- **Summary Protocol for Elevated Kynurenine:**
  - Take **LivinGene Cell Detox and Cell Shield**
  - Lower inflammation with curcumin, resveratrol, omega-3s, and vitamin D
  - Protect the brain from neuroinflammation with glutathione, magnesium, and antioxidants
  - Shift tryptophan metabolism back toward serotonin with B vitamins and clean eating
  - Reset circadian rhythms with sunlight exposure and blue light blocking
  - Calm the nervous system with breathwork, adaptogens, grounding, and sleep optimization
  - Heal gut, detox triggers, and consider deeper testing if inflammation persists

Critical (High)

PFAS (Per- and Polyfluoroalkyl Substances) are synthetic chemicals found in non-stick cookware, food packaging, and water-resistant fabrics. They are linked to hormone disruption, immune suppression, and cancer. PFAS (including PFOS and PFOA) are man-made chemicals used in non-stick cookware (Teflon), waterproof/stain-resistant coatings, food packaging, fire retardants, dental floss and contaminated drinking water (near military bases or industrial areas). They're called **"forever chemicals"** because they don't break down easily.

- **1. Switch to Clean Water Immediately**
  - Use **high-grade water filtration** — standard carbon filters won't remove PFAS.
    - **Best options:**
      - **Reverse osmosis**
      - **Berkey filters with PF2 elements**
      - **Clearly Filtered pitcher or under-sink systems**
    - Avoid:
      - Tap water
      - Bottled water (often contaminated)
      - Fluoridated or chlorinated water (worsens toxicity)
- **2. Support Liver Detox (PFAS is hepatotoxic)**
  - Liver phase I & II detox boosters:
    - Take **LivinGene Cell Detox**
      - **Milk thistledandelion rootartichoke leaf**
      - **NAC** – precursor to glutathione
      - **Glutathione (liposomal or IV)** – direct antioxidant defense
      - **Turmericalpha-lipoic acidcastor oil packs**
- **3. Bind and Eliminate PFAS from the Gut**
  - PFAS recirculate via bile — **you must bind and excrete**.
    - Powerful binders:
      - **Chlorella** – chelates and grabs PFAS, heavy metals
      - **Activated charcoal** – binds PFAS (use away from food/supplements)
      - **Bentonite clay** – adds mineral exchange
      - **Modified citrus pectin** – gentle, gut-safe binder
      - **Acacia fiber or psyllium husk** – helps move toxins out
    - *Tip: Use binders after meals and ensure daily bowel movements.*
- **4. Activate the Sweat Pathway (Essential for PFAS)**
  - PFAS is excreted **more effectively via sweat** than urine or stool.
    - Top methods:
      - **Infrared sauna** (15–30 min 3–4x/week)
      - **Hot Epsom salt baths**
      - **Rebounding or exercise + sauna** for lymphatic push + sweat
- **5. Repair the Gut-Liver Axis + Support Elimination**
  - Gut health matters — bile recycles toxins unless excreted.
  - **L-glutamineprobioticszinc carnosine**
  - **Digestive bitters** before meals
  - **High-fiber diet** (greens, seeds, berries)
  - **Hydration with electrolytes** to support kidney clearance
- **6. Protect Hormones and Mitochondria from PFAS Damage**
  - Endocrine & energy protection:
    - Take **LivinGene Cell Shield and Cell Renew**
    - **Omega-3s (EPA/DHA)** – reduce inflammation
    - **Vitamin D3/K2** – hormone balance + detox pathways
    - **CoQ10**, **PQQmagnesium** – support mitochondria
    - **Adaptogens** (ashwagandha, maca) – regulate stress and hormonal resilience
- **7. Avoid Future Exposure (Critical Step)**
  - Replace:
    - Non-stick pans ? **ceramic, cast iron, or stainless steel**
    - Conventional dental floss ? **PFAS-free versions (e.g., coconut floss)**
    - Fast food packaging ? **cook fresh at home**
    - Stain-resistant furniture ? untreated fabrics
  - Use: Clean personal care, cleaning, and laundry products
    -
    - Glass or stainless bottles — **never microwave plastic or paper containers**
- **Optional Testing:**
  - **PFAS blood test** (via Vibrant, MosaicDX, or some state labs)
  - **Liver enzymes (ALT, AST, GGT)**
  - **TSH**, Free T3/T4, RT3 (thyroid impact)
  - **hs-CRP**, **GlycA**, **IL-6** (if inflammation suspected)
- **Summary Protocol to Detox PFAS (PFOS) Naturally:**
  - Take **LivinGene Cell Detox, Cell Shield, Cell Renew and Cell Biome**
  - Use reverse osmosis or Berkey water for drinking + cooking
  - Support liver detox with NAC, milk thistle, turmeric, and glutathione
  - Bind PFAS in the gut with chlorella, charcoal, citrus pectin, and fiber
  - Sweat regularly with sauna or hot baths
  - Heal the gut and ensure daily elimination
  - Protect hormones + mitochondria with omega-3s, CoQ10, and adaptogens
  - Remove PFAS sources from cookware, floss, furniture, and food packaging
  - ""

Critical (High)

Perfluorooctanoate (PFOA) is a type of PFAS used in non-stick coatings, stain-resistant fabrics, and firefighting foams. It's linked to hormone disruption, immune imbalance, and cancer. PFOA is used in teflon/non-stick cookware, food wrappers and grease-proof packaging, flame retardants and stain-resistant materials, water-repellent clothing and firefighting foams. PFOA is lipophilic, stores in fat and liver, and is excreted very slowly.

- **1. Stop Ongoing Exposure Immediately**
  - Water:
    - Use **reverse osmosis or Berkey with PF-2 filters** — carbon filters are not enough.
    - No tap water for drinking, cooking, or tea.
  - Other sources to avoid:
    - Non-stick pans → replace with **ceramic, cast iron, or stainless steel**
    - Microwave popcorn bags, fast food wrappers
    - Stain-resistant carpets, clothing, upholstery
    - Teflon dental floss → use **PFAS-free floss (e.g., coconut or silk)**
- **2. Support Liver Detoxification (PFOA stresses hepatocytes)**
  - Liver detoxifiers:
    - Take **LivinGene Cell Detox**
    - **NAC (600–1200 mg)** – glutathione precursor
    - **Milk thistle (silymarin)** – promotes liver cell repair
    - **Curcumin** – anti-inflammatory, supports bile flow
    - **Artichoke leaf, dandelion root** – increase liver drainage
    - **Castor oil packs** – nightly over liver for 2–4 weeks
  - Optional: **Liposomal glutathione** if stronger support is needed
- **3. Use Specific Binders for PFOA in the Gut**
  - PFOA undergoes **enterohepatic recirculation** → it must be **bound in the gut** and excreted.
  - Best binders:
    - **Chlorella (2–4g/day)** – binds PFOA + supports glutathione
    - **Modified citrus pectin** – gentle binder, safe long-term
    - **Activated charcoal** (away from food/supplements)
    - **Psyllium husk or acacia fiber** – enhances bile excretion
    - **Bentonite clay** – supports mineral exchange and toxin grab
    - *Ensure 1–2 solid bowel movements daily for successful elimination.*
- **4. Support Hormonal and Thyroid Resilience**
  - PFOA disrupts **thyroid hormone receptor function** and estrogen/testosterone balance.
  - Nutrients:
    - **Selenium** – protects thyroid + aids detox enzymes
    - **Zinc** – supports hormone receptors
    - **Iodine (microdose if tolerated)** – competitive inhibition at thyroid
    - **Vitamin D3/K2magnesiumomega-3s** – reduce systemic endocrine inflammation
    - **Ashwagandha or Rhodiola** – for HPA axis + adrenal-thyroid support
- **5. Sweat It Out (Critical for PFOA Elimination)**
  - Like PFOS, **PFOA is efficiently excreted via sweat**.
  - Best strategies:
    - **Infrared sauna (20–30 min, 3–5x/week)**
    - **Hot Epsom salt baths (20 min)**
    - **Exercise-induced sweat + post-workout sauna** = deep detox synergy
- **6. Strengthen the Gut–Liver Axis**
  - PFOA damages the gut and liver interface.
  - Key supports:
    - **L-glutaminealoe verazinc carnosinemarshmallow root**
    - Probiotics*Lactobacillus plantarumBifidobacterium longum*
    - **Digestive bitters** – enhance bile and enzyme flow
    - **High-fiber diet** to reabsorb and excrete bile toxins
- **7. Reduce Oxidative + Cellular Stress**
  - Add mitochondrial + cell membrane protectors:
    - **CoQ10** (ubiquinol)
    - **Alpha-lipoic acid (ALA)**
    - **Phosphatidylcholine** – membrane repair
    - **Astaxanthin** – lipid antioxidant, brain + skin protector
- **Optional Testing (if deeper insight needed):**
  - **PFOA blood test** (MosaicDX, Vibrant, or Genova)
  - TSH, Free T3/T4, Reverse T3
  - Liver enzymes (ALT, AST, GGT)
  - hs-CRP, IL-6, GlycA (for inflammation baseline)
- **Summary: How to Detox PFOA Naturally**
  - Take **LivinGene Cell Detox, Cell Shield and Cell Biome**
  - Eliminate all PFOA exposure — cookware, water, packaging, personal products
  - Support liver detox with NAC, milk thistle, glutathione, and turmeric
  - Bind PFOA in the gut with chlorella, pectin, charcoal, and fiber
  - Promote daily bowel movements and hydration
  - Sweat regularly with sauna or hot baths
  - Support hormone balance + thyroid protection with selenium, zinc, adaptogens
  - Heal the gut-liver axis and support mitochondria with CoQ10, ALA, PC

Critical (High)

Polycyclic Aromatic Hydrocarbons (PAHs) are harmful chemicals produced from burning coal, oil, tobacco, or when grilling meat at high temperatures. They accumulate in fat, lungs, and liver and are linked to cancer, DNA damage, and respiratory issues.

- **1. Stop Exposure Immediately**
  - Remove or avoid:
    - Grilled, smoked, or charred meats (especially well-done or blackened)
    - Wood smoke, tobacco smoke, wildfires, candles, incense
    - Avoid idling in traffic or walking near heavy roads without a mask
    - Avoid synthetic perfumes, air fresheners, and petroleum-based cosmetics
  - Improve air quality:
    - Use **HEPA + activated carbon air filters** (carbon removes VOCs + PAHs)
    - Ventilate indoor spaces daily
    - Use **nasal saline or neti pot** to flush inhaled particulates
- **2. Support Liver Detox (especially Phase I + II pathways!)**
  - PAHs are metabolized in the liver but generate **toxic intermediates** that need to be conjugated and excreted
    - Key liver detox tools:
      - Take LivinGene Cell Detox
      - **Sulforaphane** (from broccoli sprouts) – upregulates glutathione + phase II enzymes
      - **NAC + liposomal glutathione** – supports clearance and antioxidant capacity
      - **Milk thistle, dandelion root/artichoke leaf** – classic liver support
      - **Alpha-lipoic acid (ALA)** – cellular and mitochondrial detox helper
- **3. Bind PAHs in the Gut for Safe Elimination**
  - Since PAHs are **lipophilic**, they can be recycled via bile unless properly bound.
    - Best binders:
      - **Chlorella** – binds PAHs + enhances glutathione
      - **Activated charcoal** – binds fat-soluble toxins (use 1 hour away from supplements/food)
      - **Bentonite clay** – adds broad-spectrum environmental binding
      - **Modified citrus pectin (MCP)** – gentle but effective binder
      - **Psyllium husk or flaxseed** – helps with daily toxin elimination
- **4. Activate Sweating for Deeper Elimination**
  - PAHs are excreted via **sweat and stool**, not urine.
    - Top methods:
      - **Infrared sauna therapy** (20–30 min, 3–5x/week)
      - **Epsom salt or hot baths** (add ginger or mustard powder for enhanced effect)
      - **Exercise-induced sweating + sauna** combo = gold standard for environmental detox
- **5. Heal and Seal the Gut Barrier**
  - PAHs increase gut permeability and microbiome imbalance.
    - Gut-healing tools:
      - Take LivinGene Cell Biome
      - L-glutaminezinc carnosinealoe veramarshmallow root
      - **Probiotics***L. plantarum**B. breve**S. boulardii*
      - Fiber-rich plant foods to bind and excrete toxins naturally
- **6. Protect DNA + Mitochondria from PAH Damage**
  - PAHs form **DNA adducts** and damage mitochondria.
    - Protective nutrients:
      - **Resveratrol + quercetin** – DNA-protective and anti-mutagenic
      - **CoQ10 (ubiquinol)** – mitochondrial defense
      - **Astaxanthin + tocotrienols** – antioxidant protection for membranes and brain
      - **Vitamin C (buffered)** – reduces oxidative burden
- **7. Flush + Rebuild: Water, Minerals, Rest**
  - **3 liters of clean water/day**, preferably filtered with **reverse osmosis** or Berkey
  - Add trace minerals (e.g., Celtic salt, electrolyte drops) to support detox enzymes
  - Sleep 7–9 hours — critical for liver phase II detox + DNA repair
  - Daily bowel movement required — use magnesium, fiber, bitters if needed
- **Optional Testing (If deeper insight needed):**
  - **Urinary PAHs or OH-PAH panel** (MosaicDX or Vibrant)
  - **8-OHdG (oxidative DNA damage marker)**
  - **Glutathione levels, hs-CRP, IL-6, GlycA**
  - **Mitochondrial markers** or **OAT panel**
- **Summary: How to Detox PAHs Naturally**
  - Take LivinGene Cell Detox and Cell Biome
  - Eliminate smoke, charred foods, and poor air quality
  - Support liver detox with NAC, milk thistle, broccoli sprouts, ALA
  - Use binders: chlorella, MCP, charcoal, clay, and fiber
  - Sweat 3–5x/week with sauna or hot baths
  - Heal the gut and microbiome with glutamine, probiotics, and mucosal herbs
  - Take antioxidants: glutathione, CoQ10, resveratrol, quercetin, vitamin C
  - Hydrate, move, and sleep deeply to optimize detox pathways

Critical (High)

VMA (Vanilmandelic Acid) is a breakdown product of adrenaline and noradrenaline (catecholamines). Elevated Vanilmandelic Acid (VMA) is a key clue in the stress + neurotransmitter breakdown puzzle, especially around adrenaline and norepinephrine metabolism. So when VMA is elevated, it usually means the body is:

- Breaking down a **lot** of stress hormones (adrenergic overload)
- Running in a **chronic fight or flight state**
- Possibly experiencing **emotional trauma**, **overstimulation**, or **neurotransmitter exhaustion**
- Dealing with **COMT or MAO enzyme imbalances**, detox overload, or methylation issues
- Rarely, a **pheochromocytoma** (if VMA is extremely high — >25 mg/g creatinine — needs ruling out)

- **1. Calm the Sympathetic Nervous System (The Root Driver)**
  - High VMA = high adrenaline metabolism = nervous system on overdrive.
    - Daily parasympathetic reset:
      - **Belly breathing** (4-7-8 or 6-6 pattern)
      - **Grounding**, **forest walks**, **sunlight exposure**
      - **Meditation**, **HRV biofeedback**, **vagal nerve toning**
      - **Epsom salt baths** – magnesium + relaxation
- **2. Support COMT + MAO Enzymes (Adrenaline Breakdown Pathways)**
  - VMA rises when **catecholamine breakdown pathways** are **overloaded or genetically weak**.
    - Nutrients to support COMT/MAO:
      - **Magnesium** (COMT cofactor)
      - **Vitamin B2 (riboflavin) + B6 (P5P)** – MAO cofactors
      - **Methylated B12** + **5-MTHF** (especially if MTHFR or COMT SNPs)
      - **Choline + TMG (trimethylglycine)** – for methylation + detox
- **3. Lower Adrenaline Production (Calm the Drive System)**
  - If the body is making too much adrenaline, reduce triggers:
    - Reduce:
      - **Caffeine** and stimulants
      - **High-intensity workouts** (go gentler for now)
      - **Emotional overcommitment / perfectionism mindset**
      - **Excess screen time / news / EMF exposure**
    - Support adrenal calm:
      - **Ashwagandhaholy basilL-theaninephosphatidylserine**
      - **Vitamin C**—adrenal antioxidant
      - **Rhodiola** – only if person is depleted, not already overstimulated
- **4. Protect the Brain from Neurotransmitter Exhaustion**
  - Excess VMA means the brain is **depleting dopamine and norepinephrine reserves**.
    - Restore balance with:
      - **Tyrosine** or **Mucuna pruriens** (dopamine precursors – cautiously used)
      - **Magnesium threonatel -theanineglycine**
      - **GlutathioneNAC** , or **ALA, DHA** for oxidative protection
- **5. Prioritize Sleep to Reset the Neuroendocrine System**
  - Without restorative sleep, the **adrenal-catecholamine loop never resets**.
    - Sleep ritual:
      - **Dark, cool room**
      - **No screens 1 hour before bed**
      - **Use magnesium glycine theanine** , or **apigenin** to wind down
      - Sleep **before 10:30 PM** to sync with cortisol drop
- **Optional Deeper Testing:**
  - If VMA remains high, or symptoms persist:
    - **DUTCH Complete or Organic Acids Test (OAT)**– for full catecholamine map
    - **Salivary cortisol panel**
    - **Methylation panel** (homocysteine, B12, folate, SAMe)
    - Rule out **pheochromocytoma** if VMA is extremely high (>25 mg/g)
- **Summary Protocol for Elevated VMA:**
  - Calm the sympathetic system daily with breathwork, grounding, and sunlight
  - Support COMT/MAO with magnesium, B2, B6, methylated B vitamins, choline
  - Reduce adrenaline production by lowering caffeine, stress, overstimulation
  - Rebuild neurotransmitter balance with amino acids, magnesium, and antioxidants
  - Sleep deeply every night to allow full nervous system repair
  - Consider deeper testing if elevations are persistent or symptoms are severe

Optimal

Nicotinamide (NAM)

Nicotinamide (NAM) is a form of vitamin B3, essential for NAD+ production and cellular energy. Low levels are associated with lower NAD+ production, and high levels are associated with inhibition of Sirtuins and NAD+ recycling pathways.

Elevated

Nicotinamide Riboside (NR) is a potent precursor to NAD+, crucial for cellular energy, DNA repair, and longevity. NR is known to improve mitochondrial function, cognitive health, and metabolic performance. Elevated Nicotinamide Riboside (NR) usually means too much NR supplementation is not being efficiently converted into NAD+. There's a blockage in NAD+ salvage pathway, methylation stress (because clearing excess NR and its metabolites needs methyl groups) and possible mitochondrial congestion (energy production bottleneck). It suggests that the body has more "raw material" than it can process into usable NAD+, like flooding a clogged pipe.

- **1. Pause or Adjust Nicotinamide Riboside Supplementation**
  - If NR supplements are being used: **pause, lower the dose, or pulse** (e.g., take 2–4 days/week only).
  - Goal:
    - Let the body's natural NAD+ systems **catch up and clear backlog**
    - Avoid overloading salvage pathways and methylation cycles
- **2. Support the NAD+ Salvage Pathway (Turn Raw NR into Usable NAD+)**
  - Boost NAMPT enzyme (key for salvaging NR into NAD+):
    - **Intermittent fasting** (14–16 hours)
    - **Exercise** (especially strength training + aerobic combo)
    - **Polyphenols resveratrol quercetin pterostilbene**
    - **Spermidine-rich foods**: (natto, wheat germ, aged cheese)
  - These activate **SIRT1**, which indirectly **boosts NAMPT**.
- **3. Protect the Methylation System**
  - Excess NR = more need for methylation (to detoxify nicotinamide byproducts).
    - Methylation nutrients:
      - **Methylated B12 (methylcobalamin)**
      - **5-MTHF (active folate)**
      - **Betaine (TMG)**
      - **Choline** (eggs, salmon, beets)
    - Optional: **SAMe** if methylation is weak
- **4. Repair and Unclog Mitochondria**
  - If NAD+ pathways are stressed, mitochondrial bottlenecks may also exist.
    - Mitochondrial helpers:
      - Take **LivinGene Cell Shield and Cell Renew**
      - **CoQ10 (ubiquinol)** – stabilizes electron transport
      - **Alpha-lipoic acid (ALA)** – regenerates oxidized antioxidants
      - **Astaxanthin and Delta Tocotrienols** – protects mitochondrial membranes
      - **PQQ** – stimulates mitochondrial biogenesis
      - **Magnesium** – supports mitochondrial enzymes
- **5. Lower Inflammation and Oxidative Stress**
  - Excess oxidative stress blocks NAD+ synthesis.
    - Anti-inflammatory tools:
      - Take **LivinGene Cell Shield**
      - **Curcuminresveratrolgreen tea EGCG**
      - **Omega-3 DHA/EPA** – lower systemic inflammation
      - **Vitamin D3/K2** – immunomodulator
- **6. Calm the Nervous System and Lower Cortisol**
  - Chronic cortisol suppresses NAD+ salvage enzyme (NAMPT).
    - Nervous system reset:
      - Breathwork (4-7-8 breathing)
      - Morning sunlight exposure
      - Adaptogens: **ashwagandharhodiolaholy basil**
      - Prioritize **deep sleep** (7–9 hrs/night)
- **Optional Testing**:
  - If high NR persists or symptoms remain:
    - **Methylation panel** (homocysteine, B12, folate, SAMe levels)
    - **Organic Acids Test (OAT)** – mitochondrial and NAD+ pathway markers
    - **Oxidative stress markers**: 8-OHdG, lipid peroxides
- **Summary Protocol for Elevated Nicotinamide Riboside:**
  - Take **LivinGene Cell Shield and Cell Renew**
  - Pause or lower NR supplementation and allow body systems to catch up
  - Boost NAD+ salvage naturally with fasting, exercise, and polyphenols
  - Support methylation with methylated B vitamins, betaine, and choline
  - Repair mitochondrial function with CoQ10, PQQ, astaxanthin, Delta-Tocotrienols, and ALA
  - Lower systemic inflammation with omega-3s, curcumin, and vitamin D3
  - Calm cortisol and enhance parasympathetic tone with breathwork and adaptogens
  - Sleep deeply to reset mitochondrial and NAD+ systems

Understanding Your Results: **Genetic Predispositions**

Although humans share 99.9% of the same genes, subtle differences in our DNA sequences set us apart. This test focuses on a specific type of genetic variation known as Single Nucleotide Polymorphisms (SNPs), pronounced "snips." A SNP occurs when a single nucleotide in the DNA sequence is altered—for instance, a sequence might change from ATCGA to ACCGA. These minor changes, occurring approximately every 100 to 300 bases along the 3 billion-base human genome, can influence various traits. While some SNPs have significant implications, such as increasing disease risk, others may have little to no impact. Your **Lifestyle Biomarkers** are analyzed based on detected genetic variants and how they compare to the broader population. Despite any genetic predispositions, **factors like a balanced diet and regular exercise** can have a profound effect on weight and overall health. Understanding your unique genetic profile provides essential insights into how your body handles weight management, nutrition, fitness, and sensitivities to specific foods and environmental factors, empowering you to make informed decisions for improved well-being.

Weight & **Obesity**

Nutrition, Food & Environmental **Sensitivities**

Fitness & **Strength**

Weight & **Obesity**

Research suggests that genetics play a significant role in obesity, with an estimated 40- 70% of cases influenced by hereditary factors. Your genetic makeup can either reduce your susceptibility to obesity or increase your likelihood of weight gain. A genetic predisposition to obesity indicates a heightened risk of becoming overweight, but it does not account for critical environmental and lifestyle influences.

Obesity: The individual's genetic profile revealed at least two genetic risk factors for obesity. These may result in an increased risk of obesity, emotional eating, failure to feel satiated after eating, difficulty losing weight with exercise, or difficulty keeping it off. Recommendations: Though the individual's genotype suggests an increased risk for obesity, it does not mean they cannot affect their weight. Expression of those genes may be mitigated by staying physically active and maintaining a low-fat diet. Diets containing less than 20% fat, while getting most of the individual's protein from plant-based food sources such as beans, nuts, whole grains, legumes, and vegetables, are recommended. The individual should avoid excess added oils and simple or processed carbohydrates. The individual should incorporate the personalized Nutrition Select results into their diet.

Nutrition

Nutrition involves supplying the body with essential nutrients required for growth, health, and optimal functioning. By analyzing how your body metabolizes proteins, fats, and carbohydrates, alongside your genetic profile, we can gain insights into the influence of genetics on your unique nutritional requirements. This focus on critical macronutrients and vitamins allows us to provide personalized guidance, equipping you with the knowledge to make informed dietary decisions that promote overall wellness and vitality.

Carbohydrate Intake: People with this genetic profile may benefit from a moderate-fiber diet even though the risk of type 2 diabetes is normal. A diet with moderate sugar consumption will help reduce inflammation and fatty liver deposits. Key sources of fiber include vegetables, fruit, legumes, and grains.

Fat Intake: People with this genetic profile may benefit from consuming less than 20% of their daily caloric intake from fat. This genotype has been associated with promoting the synthesis of good cholesterol (HDL cholesterol) in the body and decreased insulin sensitivity. People with this genetic profile may benefit from following a diet higher in polyunsaturated fats. Key sources of polyunsaturated fats are seafood, nuts, seeds, and fats and oils such as flax oil.

Folate: Folate plays a role in DNA synthesis and repair, cell division, fetal development, maturation of red blood cells, and lowering homocysteine levels. Accumulation of homocysteine may be harmful to arteries. People with these genotypes may have normal folate levels. Key sources of folate: dark leafy vegetables, legumes, and eggs. **Protein Intake:** People with this genetic profile did not see an improvement in weight loss by implementing a high-protein diet. Key sources of protein include seafood, meat, milk, yogurt, and cheese.

Vitamin D: Vitamin D supports bone health by aiding in calcium absorption. It also contributes to the health of the immune system, organs, and muscle function. People with these genotypes are at a decreased risk of having low bone mineral density (BMD) disorders such as osteoporosis. Key sources of vitamin D include seafood, milk, yogurt, and sunlight.

Food & Environmental **Sensitivities**

Food and Environmental Sensitivities refer to your body's adverse reactions to specific foods, food components, or environmental substances based on your genes. Food sensitivities can manifest through gastrointestinal symptoms such as bloating, diarrhea, abdominal discomfort, nausea, vomiting, constipation, loose stools, reflux, and heartburn. Environmental sensitivities, on the other hand, assess your body's responses to common allergens such as pollen, dust, and pet dander. By identifying these sensitivities, we can offer tailored recommendations to help you make informed dietary choices and minimize exposure to environmental triggers, supporting your overall health and well-being.

Alcohol Metabolism:

Caffeine Metabolism:

Cow Milk Protein Intake:

Dust Sensitivity:

General Food Sensitivities:

Gluten Sensitivity:

Peanut Sensitivity:

Pet Sensitivity:

Pollen Sensitivity:

Fitness & **Strength**

Strength refers to the capacity to generate maximum force or lift the heaviest weight possible, while Fitness encompasses a broader spectrum of physical capabilities, including flexibility, agility, balance, and precision. Genetic factors play a significant role in influencing your body's response to physical activity. By analyzing specific Single Nucleotide Polymorphisms (SNPs), we can assess your potential for developing muscle strength, determine whether your physiology is better suited for power-based or endurance-focused exercises, and evaluate your aerobic response to cardiovascular training. This insight enables a personalized approach to optimizing your physical performance and fitness goals.

Endurance vs Power: People with these genotypes are more suited to power exercises as opposed to endurance training. Recommendations: The individual should try moderate-intensity exercises such as cycling, swimming, or running. Workouts should include lower weights with higher repetitions.

Muscle Strength: People with these genotypes are more likely to have larger muscle volume and greater strength and power compared to other genotypes. Even though the individual may experience a dramatic increase in muscle mass, it is critical to overall health to maintain muscle mass throughout this person's life. Strength and agility training is also key to improving heart health.

VO2 Max: VO2 Max: VO2 Max is the measure of the maximum amount of oxygen a person can utilize during intense exercise. It can be an indicator of cardiovascular fitness and aerobic endurance. The genetic component contributes to the ability to increase VO2 Max. People with these genotypes reach a consistently lower maximum oxygen utilization than people with other genotypes.

Summary

You've completed your **AgeCode™** test and unlocked a powerful, personalized map of your biology. You now know how your body is aging, how well it detoxifies and repairs, where inflammation may be hiding, and what your immune system and mitochondria need to thrive. This isn't just data-it's a direct invitation to take control of your health, energy, and longevity.

With this deep insight, its time to support your body with our targeted, precision nutraceuticals, **LivinGene™** - each one designed to meet your cellular needs and upgrade your longevity from the inside out:

Here's your step-by-step action plan:

- **Step 1: Cell Detox** – Begin here. Support your body's natural cleansing processes and flush out toxins, heavy metals, parasites, and spike proteins with milk thistle, chlorella, and wormwood.
- **Step 2: Cell Repair** – Activate stem cell function and encourage deep tissue repair using nutrients like sea buckthorn and AFA blue-green algae.
- **Step 3: Cell Shield** – Defend your brain, heart, blood vessels, and cellular membranes with high-potency Omega-3 EPA/DHA and delta tocotrienols.
- **Step 4: Cell Biome** – Designed for both short-term recovery and long-term maintenance, Cell Biome is ideal for post-cleanse, post-antibiotic, or sensitive gut users seeking comprehensive intestinal resilience and repair.
- **Step 5: Cell Renewal** – Boost mitochondrial energy and cellular resilience with NAD, CoQ10, and PQQ.
- **Step 6: Cell Defense** – Fortify your natural killer cell activity and support full-spectrum immunity with powerful botanicals such as reishi, astragalus, and Clitoria ternatea.
- **Advanced: IMUN™** – It is highly recommended that you bank your immune system's healthy cells now, while they are at their peak, to preserve your long-term health and support future regenerative and immune therapies.

Turn to **Page 4** to view your personalized **“Recommendations”** and follow the customized plan based on your AgeCode™ test results.

Take action today and set a reminder to retest in 180 days to monitor your improvements, adjust your protocol, and stay on the path of optimal health.

To your health, vitality, and extended lifespan,

Genetic LifeSpan, Inc.

Data

ID	SAMPLE	RSID	VALUE
177		rs1801131	TT
178		rs1801133	AG
179		rs324420	AC
180		rs17602729	GG
181		rs5082	AG
182		rs10174949	GG
183		rs1260326	CT
184		rs1801282	CG
185		rs7617456	GG
186		rs11715829	TT
187		rs17366568	GG
188		rs17616434	CT
189		rs2282679	GG
190		rs6552828	AA
191		rs7192	GG
192		rs2187668	CC
194		rs9275596	TT
195		rs2016520	CT
196		rs10499043	CC
197		rs1799983	--
198		rs7903146	CC
199		rs12255372	GG
200		rs6265	CC
201		rs1815739	CT
202		rs2155219	GT
203		rs1544410	CC
204		rs2228570	AA
206		rs1421085	CT
207		rs1121980	AG
208		rs8050136	AC
209		rs9939609	AT
210		rs17782313	TT
211		rs738409	CG
212		rs4253778	CG
476		rs6594499	AC
477		rs3177928	AG
478		rs7775228	TT
479		rs671	GG
480		rs762551	AA