Keto Diet Mastery: The 7 key tools to optimize your ketogenesis to the next level.

Lessons from 25 years of doing keto.

By Matt Gallant

CEO and co-founder of BiOptimizers
Bachelor's degree in Kinesiology and Sc. of Phys. Act.
Conditioning coach for multiple pro-athletes
Serial entrepreneur
Over 14 years experience formulating supplements

biOptimizers™

Healthy High Performance From The Inside Out™

What you're going to learn

- The cutting edge of nutrition and genetics
- The most advanced muscle building strategies
- How to safely lose weight permanently
- How to optimize your diet for brain performance
- How to take your keto diet and health to the next level
- The most powerful form of testing and much much more

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Who is Matt Gallant?

- Bsc degree in kinesiology and science of physical activity.
- I was a personal trainer for a decade (Trained NHL hockey player and pro fighters).
- My speciality was helping clients lose a lot of weight (191 lbs in 18 months)
- Got obsessed with bodybuilding for a few years.
- Started cyclical keto 26 years ago (when I was 16).
- Got obsessed with training hand-to-hand combat and MMA.
- Been biohacking and doing biological optimization for 18 years.
- Co-founded BiOptimizers 16 years ago.
- Built over 50 lbs of muscle since I've been training

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The 7 keys to biologically optimizing your diet

1. Sustainability
2. Lifestyle
3. Genetics
4. Allergies
5. Gut Biome
6. Biofeedback
7. Goals

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Sustainability is everything

The most important question you should always ask yourself or your clients when making a dietary commitment is “Can I do this for the rest of my life?”

If you can’t, you’re setting yourself up for an epic fail.

However, what is “sustainable for life” changes with time:

- Your gut biome changes
- Your cravings change
- You’re bodies sensations, energy and vitality change.
- Your level of consciousness around health changes
- Give yourself time for these changes to take place

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Lifestyle

Creating the ultimate dietary lifestyle is how you maintain sustainability.

These include:

- Vacations
- Weekends
- Celebrations
- Your work

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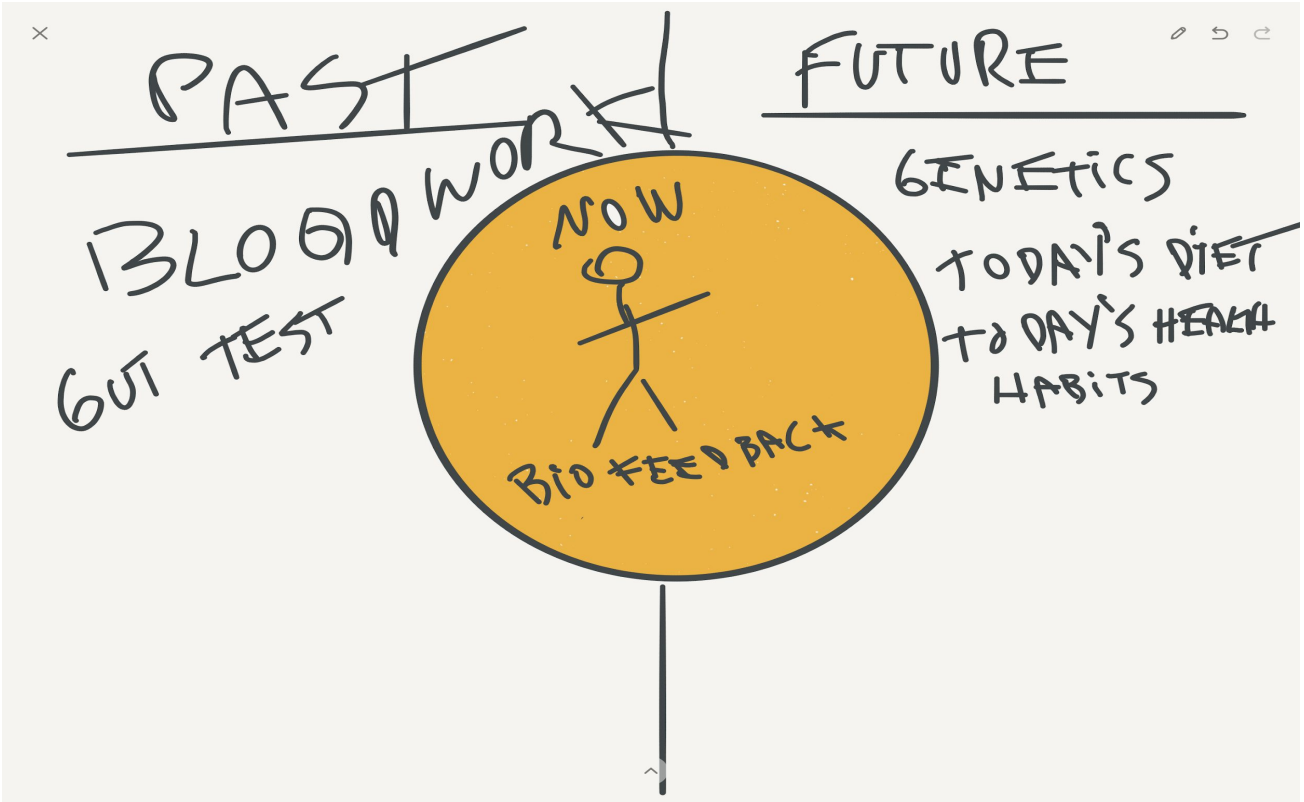
What the data tells you...



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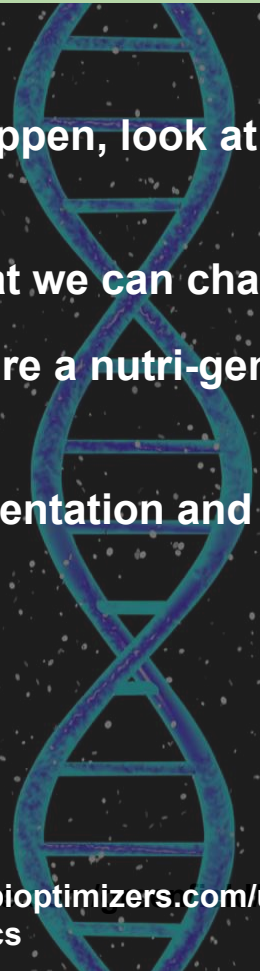
Assessment tools: Genetics



- **Genetics tell you what COULD happen, look at your genetics as possibilities not an inevitability**
- **Epigenetics are now revealing that we can change our genetics**
- **Making sense of your genetics, hire a nutri-genomics expert like Katrine Volynsky**
- **Helps you optimize your supplementation and nutrition to deal with mutations**

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Genetics: MACRO VIEW

- Your mothers mitochondria holds the keys to optimal diet and environment
- We are optimized for the environment that our maternal line has adapted to over the last few hundred years. For the majority of people, 98%+ of our mitochondrial genome is inherited from our mothers
- This implies that we are by and large optimized for both the climate and food sources that our mothers and their ancestors were accustomed to. the combined nuclear DNA from both parents is the partner in the epigenetic dance of optimization and survival
- As you go farther from the equator, fat intake increases and plant intake goes down, and as you get closer to the equator, the lower the intake of total and type of fat and the higher the intake of plant foods

Genetics: MACRO VIEW

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Genetics: MACRO VIEW

- **Seasonal Variations :** There isn't one documented culture that survives on a year-round high-fat diet that puts them in a perpetual state of ketosis. We also do not have any long-term studies on people following a Ketogenic diet over decades of time as of yet. Seasonal variations in fat intake are natural with higher carb and/or fiber intake in summer and lower in winter. Examples: inuits consume one third to half of their calories in winter in fat and one seventh of the diet consists of fat in summer. Eating out of season food alters glucose and fat metabolism
- **Eating Cherry out of season study:** Downregulation of two genes, Bmal 1 and Cry1, that govern circadian rhythms Decreased expression of Ucp1 (uncoupling protein 1) in white adipose tissue. Decreased expression of genes that promote fatty acid oxidation. Changes to PPAR alpha expression. Eating out of season appears to produce these adverse metabolic effects by disrupting circadian rhythms, the set of biochemical processes within the body that follow an approximately 24-hour schedule and regulate many aspects of our behavior and physiology. How does the body know if food out of season ? Could be sun, temperature and other external cues. The phytochemicals in fruits and vegetables have a direct effect on biochemical pathways in animals, including us humans, via evolutionarily conserved signaling pathways. These phytochemicals vary in availability depending on the season.

Genetics: Vegetarian Genetics

- **Carb digestion genetics AMY1** - salivary start predigestion gene. If ancestrally you have more copies of it - you are better at metabolizing good carbs. If you have less - take in less carbs (either test or know your ethnicity). Vegetarians with more AMY1 will do better long term. Amylase production strongly influences how we metabolize starchy foods
- **Lactase genetics** - ethnic groups and dairy products in Keto and Vegetarian diet. Lactase persistence LCT (Lactase) and MCM6 (Minichromosome Maintenance Complex Component) involved in lactase persistence
- **FUT and SHBG genes** - more requirements for fiber in the diet and B12 needs
- **The FADS1 gene** found in vegetarian farmers produces enzymes that play a vital role in the biosynthesis of omega-3 and omega-6 long-chain polyunsaturated fatty acids (LCPUFA). These LCPUFAs are crucial for proper human brain development, controlling inflammation and immune response. While omega-3 and omega-6 LCPUFA can be obtained directly from animal-based diets, they are absent from plant-based diets. Vegetarians require FADS1 enzymes to biosynthesize LCPUFA from short-chain fatty acids found in plants (roots, vegetables and seeds)

Genetics: Vegetarian Genetics

- **BCMO1 -** polymorphisms in the BCMO1 gene (R267S and A379V) can collectively reduce beta-carotene conversion to vitamin A by 69%. A less common mutation (T170M) can reduce conversion by about 90% in people who carry two copies. Vitamin A is abundant in animal based diets and vegetarians with BCMO1 polymorphisms will eventually get into deficiency. About 45% of the population carry polymorphisms that make them "low responders" to beta-carotene
- **PEMT activity** (women especially). Choline production internally depends on PEMT activity. SNP polymorphism can impair internal process of methylating a molecule of phosphatidylethanolamine (PE) into a molecule of phosphatidylcholine (PC) via PEMT enzyme pathway, vegetarians with PEMT variations may not produce enough choline. Women in pre-menopause and menopause who are vegetarian are especially in need of choline with falling estrogen levels (MTFR, folate and CHDH issues can further make this problem worse for vegetarians)

Keto Genetics

- **FAD1 and FAD2** Analysis of ancient DNA revealed that prior to humans' farming, the animal-based diets of European hunter-gatherers predominantly favored the opposite version of the same gene, which limits the activity of FADS1 enzymes and is better suited for people with meat and seafood-based diets. FAD1 and FAD2 inability to convert plant omega-3 fatty acids to EPA and DHA, showing another pathway that is enabling a high intake of animal-based omega-3's. Animal meat, fish and eggs are already rich in EPA, DHA and arachidonic acid, which reduces the need for the FADS1 protein.
- **CPT1A Arctic mutation for fatty oxidation.** (Eskimos and Inuit study)
- The CPT1A gene is found in the liver and kidney, is responsible for ketogenesis, and is the key regulator for importing long-chain fatty acids into mitochondria to help maintain energy and normal blood sugar levels when carbohydrate intake is low. The CPT1A gene mutation increases heat in the body to stay warm in a cold climate by directing free fatty acids away from liver cells to brown fat, a greater capacity for gluconeogenesis (creation of glucose) and an improved ability to excrete urea to remove excess ammonia from a high-protein diet.

- Homozygous genotype in the CPT1A gene. 81% of Canadian and 54% Greenland Inuits and 68% of one Northeast Siberian population have variants in CPT1A. This mutation results in 20% less enzyme activity of CPT1A, causing low levels of ketones and low blood sugar, resulting in a lack of ketogenesis and the promotion of hypoglycemia in response to fasting.

Fasting Genetics

- **PPAR-alpha gene (coastal adaptation gene) - Lower** fatty acid metabolism, apolipoproteins, HDL, LDL and ketone body production during fasting. Variants in the PPAR-alpha gene may cause a lower production of ketone bodies during fasting.
- PPAR gene is stimulated by Omega 3 and healthy Omega 6 Intake, astaxanthin, pterostilbene (blueberries, mulberries, cranberries, raw almonds), zinc tomatoes, Lion's Mane mushroom, fermented soy, and Gynostemma tea. Interesting enough, coconut oil, a tropical saturated fat, does not negatively affect PPAR-alpha like other saturated fats. People with this genetic variant had positively adapted to stimulation via consistent food supply and products like above. IF you are homozygous this can make it difficult to get into ketosis. Exogenous ketones can be key to stay in ketosis since there is a reduced ability to make them in PRAP-alpha homozygous
- Fasting and Ketosis and high saturated fat diet will be a stressor for PPAR-alpha. One may feel poorly with on Keto diet, will have negative changes in the lipo panel. Watch your cholesterol levels if attempting to use exogenous ketones and keto diet while homozygous for PRAR- alpha

Saturated Fat Intake Genetics

- **ADRB2** plays a role in energy balance and metabolism. It's considered a "thrifty gene" because it can make our bodies more efficient, using as few calories as possible to function. While efficiency might sound good, in practical terms it means that it's easier to get more out of the calories you eat, and those extra calories are stored in our fat tissue. The GG variant is the most efficient, so those who have this may consider keeping to a lower calorie, and especially lower saturated fat, plan. The AA and AG variants are better at burning excess calories.
- **APOA2** Eat fat, get fat gene (satiation gene). This enzyme regulates appetite. Those with the CC variant tend to have a higher BMI when saturated fats are included in the diet. The other two variants, CT and TT, do not show this association, and can tolerate higher amounts of saturated fats in their diets. People who eat more fat tend to be more hungry and tend to consume more calories in a day. If you have this variation and eat a lot of fat - YOU HAVE TO MOVE , don't sit at your computer all day … you will get FAT.

Saturated Fat Intake Genetics

- **FTO3** The Hangry Gene . Has to do with the hunger hormone ghrelin. The FTO gene impacts on overall body fat depending on how much fat you eat, especially saturated fat. Both the CC and CT variants of this gene tend to hold on to fat harder, and so you need less of it in the diet to compensate. The TT variant has an easier time of letting go of fat stores than other variants. People who have this, especially homozygous, are the people that are just hungry all the time. Balancing blood sugar is key (use CGM to check yourself - are you truly hungry?)
- **LPL** This gene helps to modulate whether saturated fats are stored as body fat or burned as fuel, and plays a role in how saturated fats are broken down for energy. Those with the GG variant of this gene break down saturated fats and use them for energy easily. The CG and CC variants of this gene, however, have less ability to tolerate saturated fats in the diet, since they can be easily converted into cholesterol.
- **APOC3** This gene is important in regulating blood triglyceride levels as well as LDL cholesterol, which is the more dangerous type. Saturated fats in the diet are the modulating factor of how strongly a role this gene plays. Those with the CC variant of this gene have a significantly increased risk of atherosclerosis and elevated blood lipid levels when saturated fats are present in the diet. Those with the GG and GC variants do not share this increased risk.

Plant Fats or Red Meat for Keto?

- **ACSL1–** How well you metabolize saturated fats from animals – bacon, fat bombs from dairy, etc. People with variations in this gene will have higher issues with higher fasting glucose and insulin resistance. If homozygous or even heterozygous -**focus from getting your fats from plant sources rather than animal sources.** More Mediterranean keto diet. Coconut can be useful providing one has no issues with sulfur
- **ADIPOQ** The Red Meat Gene – Adiponectin. is a hormone released in the intestinal tract when we eat foods and it has to do with how much insulin is secreted- affecting blood sugar, type 2 diabetes, etc. These are people that are predisposed to metabolic disease People that are low secreters are at a higher risk for insulin resistance, heart disease, and colon cancer – especially important to know before doing a **high meat keto diet with a lot of red meats. If you have ths use exsercise lower insulin resistance. IF can be useful in these cases and using Omega 3's to increase adiponectin secretion**

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Exhausted on Keto?

- **ACAT** How your body converts protein and fat to cellular energy. We make our body weight in ATP (cellular energy) every day. Involves cholesterol balance in the cell and ability to get energy from high protein and fat intake . If you are homozygous your cholesterol may go up on keto and you are more likely to feel exhausted on keto since you body can not use fats for fuel efficiently. Liver enzymes have to be monitored as well, since you body will have a heck a of time processing fats
- PEMT - helps you make Choline in the liver. Fat metabolism in liver can be affected by variation in this. If you are choline deficient - fatty liver. Is your liver set up to process so much fat ? If you have variations here you will have problems shuttling fat and get into problems with a gallbladder (stones). Homozygous - you will need some choline supplementation. Low in choline can not digest fat well. (Females are more prone to issues if they had been pregnant or nursed , since they use up choline faster during these times)

More Interesting Genes

APOE4 - prevention of Alzheimer's with keto diet
https://www.mygenefood.com/can-a-ketogenic-diet-prevent-alzheimers-apoe4/

Sulfur pathways and nausea/ ammonia **CBS** - mutations in CBS can lead to high or low ammonia levels. Individuals with a CBS mutation (elevated activity) often have high levels of taurine and ammonia and low cystathionine and homocysteine. This is due to the rapid conversion and if this is coupled with NOS mutations it can exacerbate ammonia issues. High ammonia is extremely toxic and inflammatory to the body. These individuals must be on a low protein diet where protein makes up about 10% of total caloric intake. For these individuals, I typically recommend a nutrition plan consisting of 70-80% fat, 10-20% carbohydrate and 10% protein. GUT HEALTH must be addressed

BiOptimizers: Nutrigenomic Testing

Nutrigenomics is one of the ultimate tools to biologically optimize your diet and health to the next level.

It will take you thousands of hours of research to do it on your own.

There's almost no one in the world that is an expert in this. BiOptimizers has one of the top people on the planet with us: Katrine Volynsky

Katrine Volynsky is a Chernobyl survivor, a nutritional expert and more importantly one of the top nutrigenomic experts in the world.

Come to the booth to get a special show only discount.

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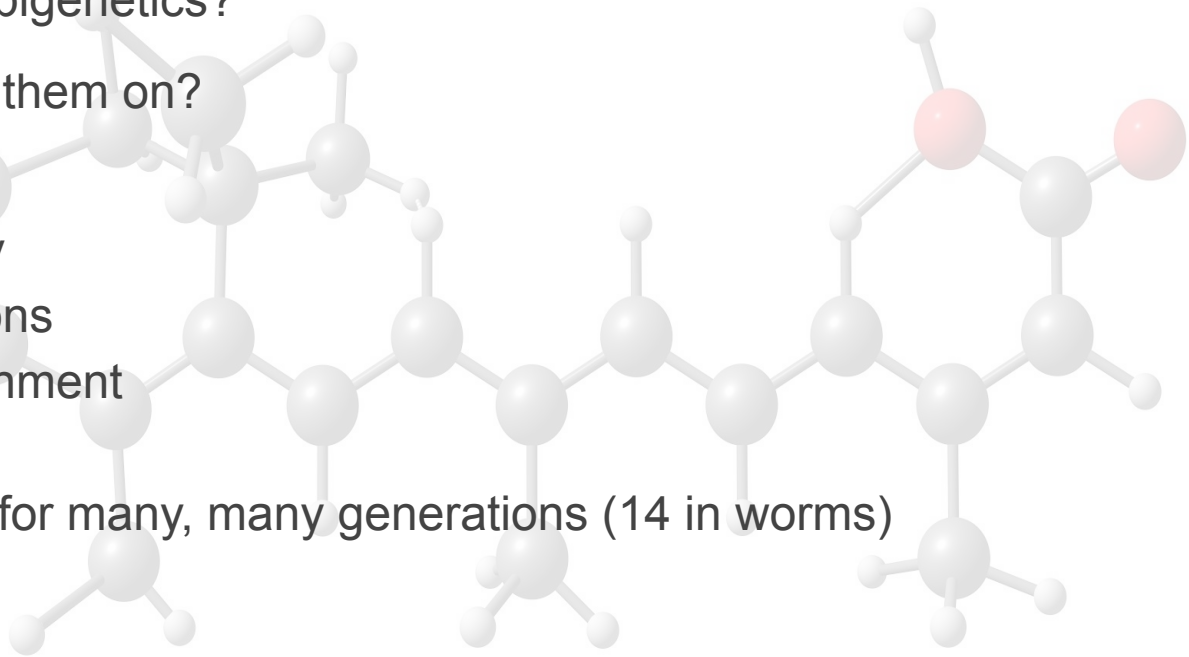
Epigenetics

- What are epigenetics?
- What turns them on?
  - Food
  - Activity
  - Emotions
  - Environment
- Passed on for many, many generations (14 in worms)



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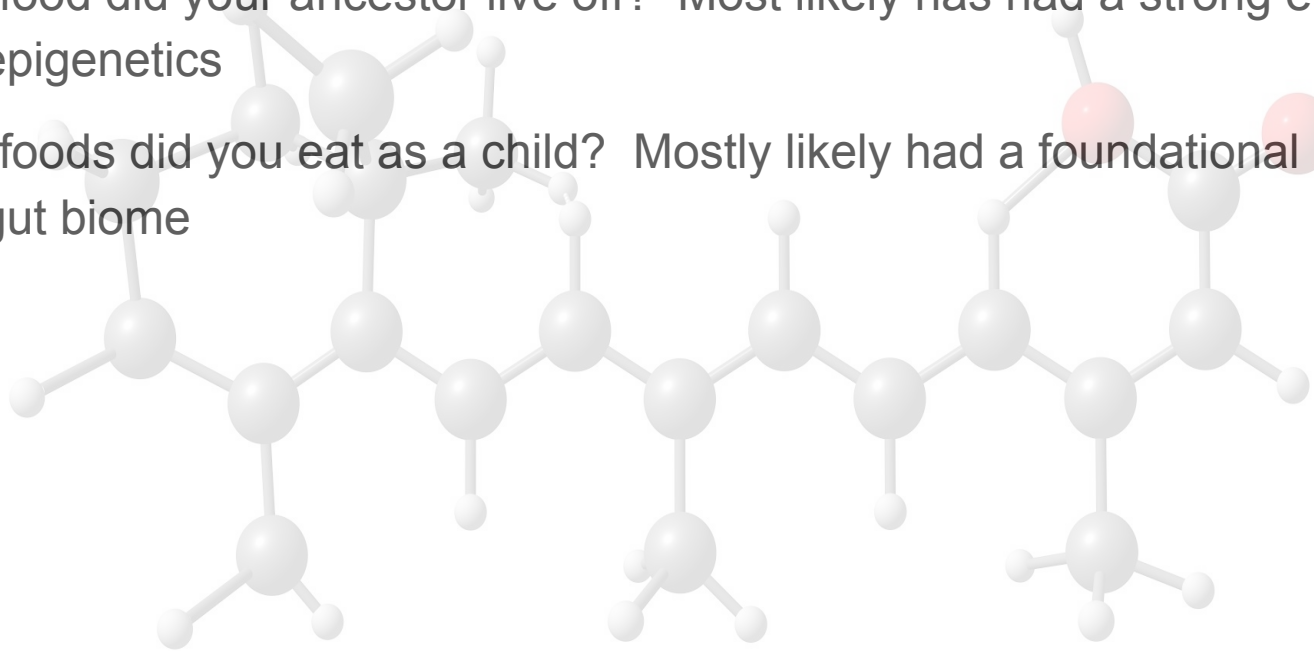
Look at your ancestors and childhood

- What food did your ancestor live off? Most likely has had a strong effect on your epigenetics
- What foods did you eat as a child? Mostly likely had a foundational effect on your gut biome



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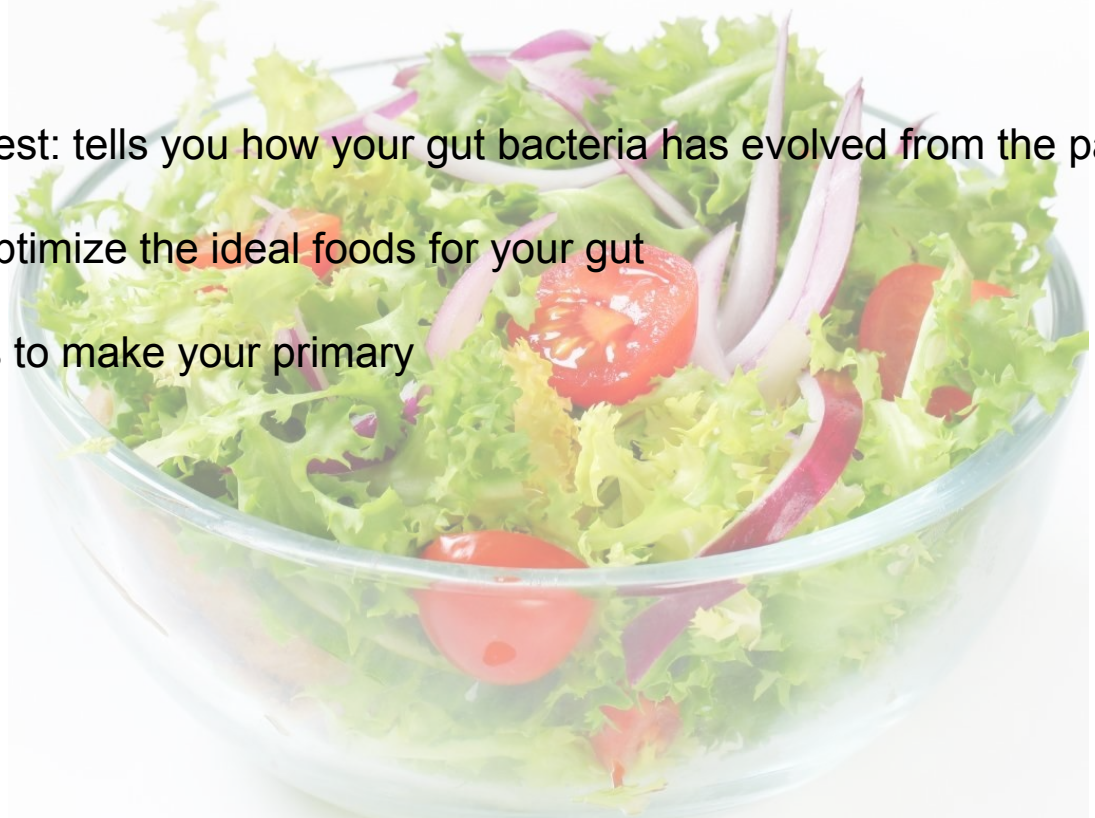
Assessment tools: gut test



- Gut Biome test: tells you how your gut bacteria has evolved from the past
- Helps you optimize the ideal foods for your gut
- Which foods to make your primary

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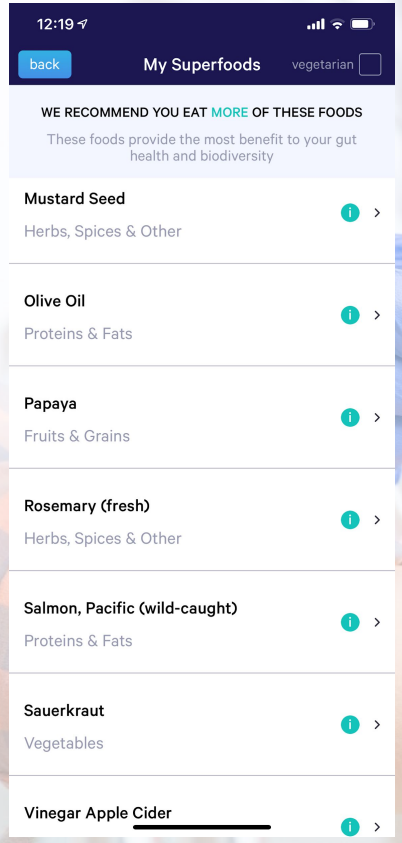
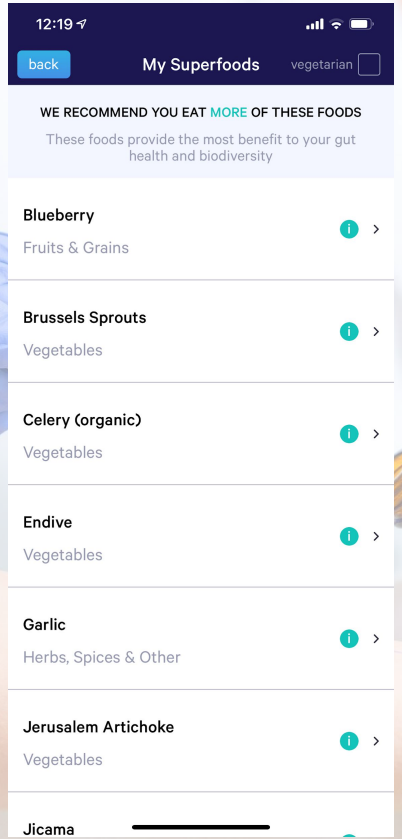
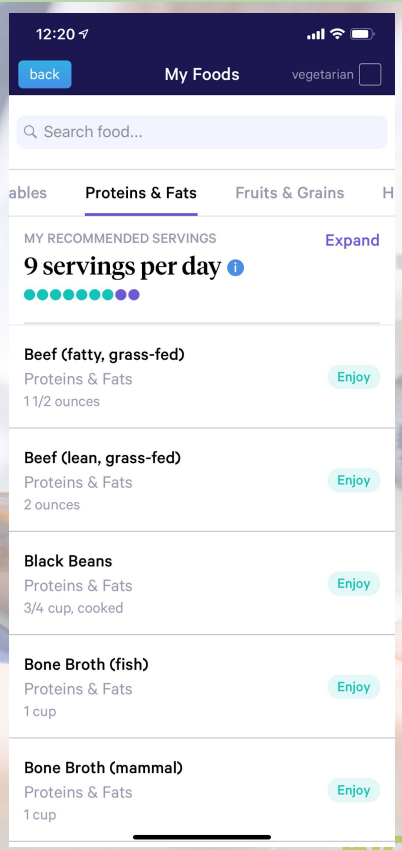
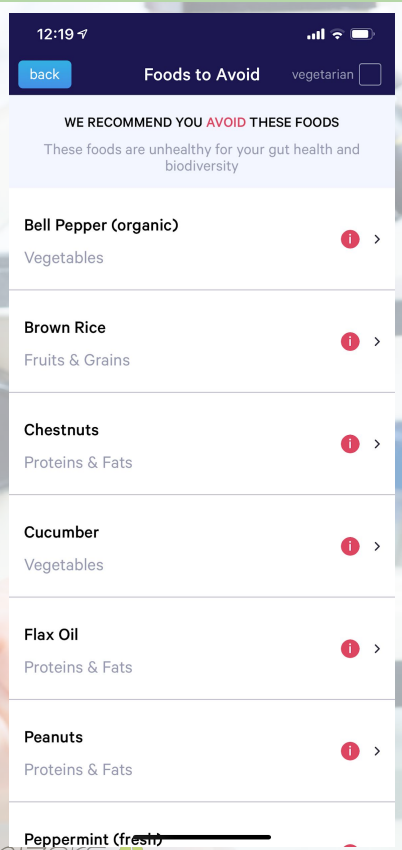
Assessment tools: Viome test









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Assessment tools: Food Allergy and Sensitivity Test

Shows you which foods you should avoid.

Food intolerances can often lead to elevated levels of whole body inflammation that can cause fatigue, joint pain, brain fog, digestive disturbances, headaches and other unwanted symptoms.

Cyrex allergy test is one of the better options.
https://www.cyrexlabs.com

Assessment tools: blood work

- Shows you what your past health habits, Biohacking, diet and exercise combined with your genetics have led to.
- It’s a snapshot of your entire past.
- The limitation of blood work: many metrics have massive daily fluctuations.
- Circadian fluctuations, food, sleep, exercise, stress all move many numbers up and down.

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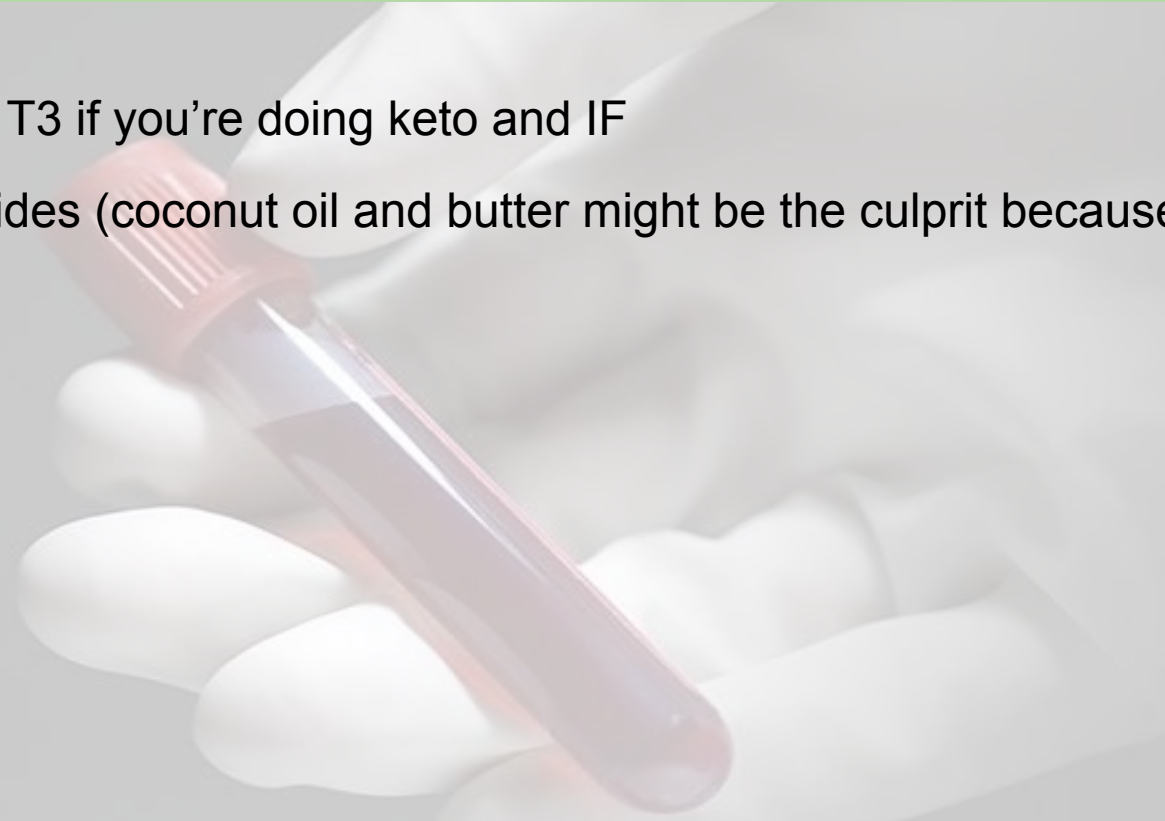
Assessment tools: blood work

- Women: watch your T3 if you're doing keto and IF
- Watch your triglycerides (coconut oil and butter might be the culprit because of your genes)



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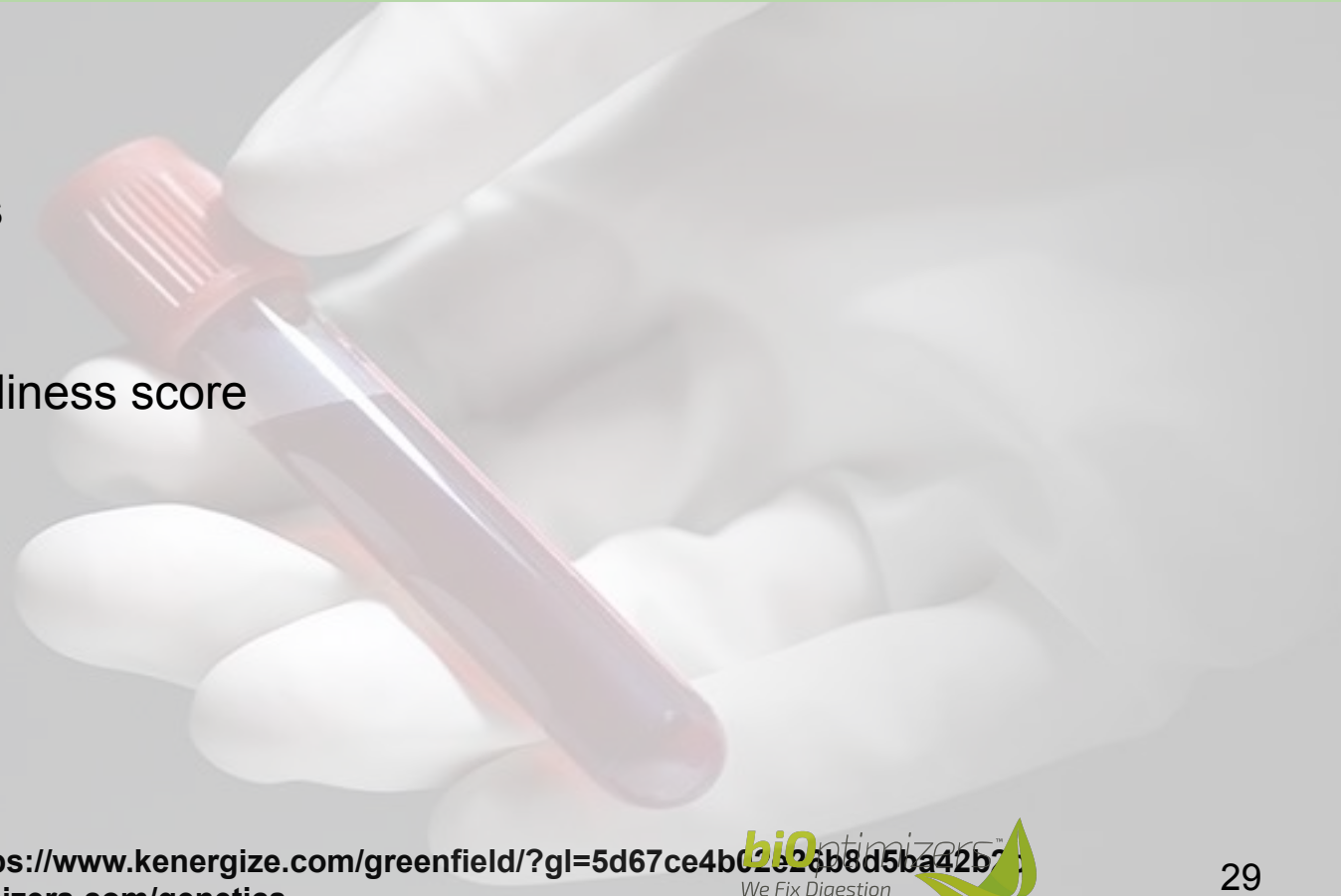
Assessment tools: biofeedback



- Create a diary
- Watch for symptoms
- HR/HRV
- Your Oura Ring readiness score
- The ultimate?

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