Nutrition Genotype Report

Client Name: Sample

HUNGER & SATIETY

GENETIC DATA

GENE	GENO TYPE
ADIPOQ (1)	AG
ADIPOQ (2)	GG
FTO	AT
MC4R	TC
ANKK1	AG
COMT	AG
DRD2	AG
NMB	TT
FTO	AT
HTR2C	CC
GSHR(1)	TC
GSHR(2)	GC
POMC	..
LEP	n/a
LEPR(2)	GG
LEPR(1)	AG
MTHFR 1298	TT

Appetite is a combination of hunger response and satiety. Many scientific studies have been undertaken to identify genomic variations that contribute to these aspects of eating. What we have discovered is that it is a complex interaction between many systems:

- Brain neurotransmitters (dopamine & serotonin)
- Intestinal peptides
- Signals from fat cells
- Appetite hormones

All components of this network require coordination in central sensing mechanisms of the brain in order to create your response.

INTERPRETATION

Likely to have moderate hunger and fullness sensing mechanisms

TYPICAL	TYPICAL
HUNGER	SATIETY

RECOMMENDATIONS

Pay attention to your body signals of hunger and fullness. Based on your lifestyle, this is unlikely to be a major issue.

INSULIN RESISTANCE

GENETIC DATA

GENE	GENO TYPE
FABP2	AA
GCKR	AA
LIPC	TC
PPARD	AA
IRS1	CC
VDR FOK1	AA
CRY2	CC
FADS1	TT
PROX1	TT
ADCY5	AA
MTNR1B	GG
SLC30A8	TC
TCF7L2	CC
G6PC2	TC
MADD	AT
ADRA2A	GG
GLIS3	AC

MODERATE

RISK

Insulin resistance is a state where the body requires greater and greater amounts of insulin in order to drive down blood sugar levels. It is usually associated with diabetes or the pre-diabetic state.

Studies have demonstrated that some individuals actually possess a greater predisposition towards insulin resistance and this predisposition can be predicted based on genetic variations. Individuals that carry greater risk tend to have higher, though frequently normal, fasting blood sugar levels and insulin levels. These higher fasting blood glucose levels also promote accelerated rates of aging in the body.

Individuals with a greater propensity towards insulin resistance often report greater difficulty losing weight than others that follow similar diets despite aggressive adherence to the diet.

Insulin Resistance Score (IRS) 47%

INTERPRETATION:

Moderate Risk for increased insulin resistance with high simple-carb diet and increased sugar intake

RECOMMENDATIONS

Consider testing blood sugar and Hemoglobin A1C levels and supplementing berberine to address this and other goals.

DAIRY

GENETIC DATA

GENE	GENO TYPE
MCM6(1)	AG
MCM6(2)	n/a
APOA2	AG

TYPICAL

SENSITIVITY

TYPICAL

DAIRY FAT

SENSITIVITY

Dairy genes relate to the processing of the sugar and the fat in dairy products.

Lactose is a sugar found in milk. Some individuals have deficiencies in the enzyme or lack the enzyme lactase that is required to fully digest the sugar. The actual gene involved is LCT but the MCM6 is a regulator of the LCT expression. Variants of the MCM6 gene only indicate a PROPENSITY toward lactose intolerance.

Certain genotypes will also express a greater propensity toward weight gain and obesity when consuming high fat dairy.

INTERPRETATION:

Unlikely to have lactose sensitivity from genetics.
Likely to interact well with Dairy fat.

RECOMMENDATIONS

GLUTEN

GENETIC DATA

GENE	GENO TYPE
HLA-DQA1	CC
HLA-DQA2	GG
HLA-DRA	TT
HLA-DQB1	TT

LOW

RISK

Gluten is a mixture of proteins found in wheat and related grains. It is also found in many food preparations because it provides elasticity and chewiness to many prepared foods. There is a difference between allergy and sensitivity, these genes relate to potential for developing allergy. See the section relating to grain sensitivity for more information. These genetics related to gluten are based on predisposition and are only suggestive of susceptibility to developing reactions to gluten in foods. This is not a diagnostic test.

INTERPRETATION:

Low risk of developing gluten intolerance.

RECOMMENDATIONS

GRAIN SENSITIVITY

GENETIC DATA

GENE	GENO TYPE
GAD1(1)	GG
GAD1(2)	TC
GAD1(3)	TG
GAD1(4)	CG
GAD1(5)	AC

INCREASED

RISK

HIGH GLUTAMIC ACID SOURCES

-Wheat and Grains
-Soy
-Dairy
-Eggs
-Chicken & Turkey
-Seeds
-MSG

Glutamic acid decarboxylase is an enzyme responsible for the conversion of glutamate into GABA. GAD1 is only present in the brain and helps us to convert the excitatory neurotransmitter, glutamate, into the inhibitory neurotransmitter GABA.

The GAD1 genes relate to the handling of glutamic acid containing foods and the potential for creation of an imbalance between excitatory and inhibitory neurotransmitters in the brain. Certain variations can lead to decreased activity of this enzyme and a tendency toward higher glutamate and lower GABA levels in the brain. This can lead to anxiety, agitation, and difficulty sleeping.

Many grains are high in glutamic acid and frequently people will misinterpret a negative response to grains as a negative response to gluten.

When these variations are significant and the symptoms are expressed, it is important to reduce exposure to glutamic acid and make sure that B6 levels remain healthy since it is required for the enzyme to work optimally

INTERPRETATION:

Increased risk of grain sensitivity

RECOMMENDATIONS

Look for symptoms: brain fog, insomnia, upset stomach, racing mind, anxiety after grain intake. Avoid Soy and MSG primarily, as well as other foods like protein shakes in the evening if symptoms occur.
Consider Magnesium Glycinate and B6 supplementation

SWEETS & SNACKING

GENETIC DATA

GENE	GENO TYPE
FTO(1)	AT
LEPR	AG
MC4R	TC
FTO(3)	TT
FGF21	AG
ANKK1	AG
COMT	AG
DRD2	AG
SLCA2	GG
SLC2A2	n/a
TAS1R2	GG
TAS1R3	..
TAS2R38	AG
MTHFR 1298	TT

INCREASED

SWEET PERCEPTION

LOW

SNACKING DRIVE

TYPICAL

ADDICTION RISK

Many people perceive that snacking behaviors and the inability to stop eating sweets are willpower based. While this may be true at times, much of the drive toward snacking and sweets is coded in our DNA. The snacking gene variations that we analyze have been applied in clinical practice for several years and there is an extremely high correlation between genetic variations and client reported snacking behaviors. The same holds true for sweets, there are genes that code for perception of sweet taste where each person can have a different perception of sweetness based on their gene variations.

There are also genes that code for the way our brains respond when we taste something sweet.

INTERPRETATION:

Despite "increased" sweet perception, my interpretation based on your lifestyle is slightly decreased sweet perception, leading to higher sweet consumption with lower snacking drive. Low addiction risk.

RECOMMENDATIONS

Find healthy alternatives to sweet food that you can substitute at mealtimes. For example, you've expressed that macadamia nuts curb your sweet cravings. Monounsaturated Fat can be a great tool.

CARBOHYDRATES

GENETIC DATA

GENE	GENO TYPE
KCDT10	GG
MMAB	CC
PLIN1	TC
UCP1	TC
TCF7L2(1)	CC
TCF7L2(2)	GG
TCF7L2(3)	CC
TCF7L2(4)	CC
CEBPA	GG
ABCG4	AA
VLDLR	AG
IGF1R	AA
LPIN(2)	TT
AGER	AC
FTO(4)	AC
GIPR	CC

TYPICAL

OPTIMAL INTAKE

HIGH

OPTIMAL FIBER

Carbohydrates are frequently praised or villainized in dietary recommendations, but the one aspect that we have identified in the genomic data is that there is no right answer that fits every person.

Carbohydrates are a very individualized component of the diet and using the current scientific literature and our experience with genomics in clinical practice, the relevant and highest impact genes have been identified.

This is especially relevant when it comes to ideal body composition as some people will do better on lower carbohydrate intake while others tend to burn fat in the flame of a carbohydrate.

Be mindful of the fact that much of this response can be modified through epigenetics. Review your past experience and your food preferences with your coach.

INTERPRETATION:

You're likely to do well with moderate complex carb intake. If weight loss is your goal, then >250g/day is recommended.
Aim for high fiber intake in your complex carbs

RECOMMENDATIONS:

Consider nutrition that maintain moderately high complex-carb intake.
Best sources of fibrous complex carbs: broccoli, leafy greens, carrots, avocados, sweet potato, other vegetables

TOTAL FATS

GENETIC DATA

GENE	GENO TYPE
APOE (1)	TT
APOE (2)	CC
APOE (3)	AG
PPARG	CC
FABP2	AA
APOA2	AG
APOB	AG
ADIPOQ	AG
TFAP2B	AG
FTO	AT
TNF	GG
LIPC	AG

MODERATE

OPTIMAL INTAKE

Primary fats of the human diet:

- Saturated fats (SFA)
- Monounsaturated fats (MUFA)
- Polyunsaturated fats (PUFA)

Depending on the source of the advice, you will hear about which ones are good for you and which ones are bad. The problem with this advice is two-fold; first, fats are a macronutrient that our bodies require for optimal health so there is no strict classification of good and bad. Second, there are significant individual differences in how each person responds to the different types of fat.

When using genetic variations to provide guidance on fat intake, it is important to understand that many of the studies used did not differentiate the types of fat. This section provides guidelines for planning the ideal percentage of calories from fat in your daily diet.

INTERPRETATION:

Overall, your body does well with most fats. A moderate amount in your diet will be optimal for weight loss, muscle gain, and general health.

RECOMMENDATIONS:

Look into each individual section of fat for more details.

SATURATED FATS

GENETIC DATA

GENE	GENO TYPE
APOE (1)	TT
APOE (2)	CC
APOE (3)	AG
PPARG	CC
APOA2	AG
APOB	AG

MODERATE

OPTIMAL INTAKE

Dietary Sources of Saturated Fat:

- Pork (bacon, sausage)
- Red meats
- Cheeses
- Potato chips/fries
- Butter
- Coconut oil
- Chocolate

Saturated fats (SFA) represent one of the most debated aspects of human nutrition today. Various studies go back and forth regarding whether it is healthy or not healthy. The Atkins and Paleo movements have brought saturated fat into the forefront of discussions.

Bottom line is that saturated fats are needed for healthy human function. Saturated fat makes up 50% of the membrane fats in every cell of our body and is essential for healthy immune function. Our brain is 60% fat and is predominantly saturated fat and cholesterol. Despite this, there can be something to getting too much of a good thing.

Each individual carries genetic variations that can change the way they respond to saturated fats from a health and wellness standpoint. The algorithm used in this profile is based on leading scientific studies into genome wide associations as well as from our extensive experience in applying this in clinical practice.

Even with moderate intake recommendations it is best for most individuals to keep saturated fat intake to less than 10% of total calories.

INTERPRETATION:

You're unlikely to experience cognitive decline or plaque buildup from saturated fat intake. Moderate saturated fat intake is acceptable

RECOMMENDATIONS:

Moderate in this context means <10% of total calories. For you, that means to stay below 20g of Saturated Fat each day.

POLYUNSATURATED FATS

GENETIC DATA

GENE	GENO TYPE
APOA5	AA
BDNF	CC
TNF	GG
FADS1	GG
ELOVL2	AA
PTGS2	AA
COX-2	TC
IL-1B	AG

MODERATE

OMEGA-6 INTAKE

MODERATE

OMEGA-3 NEED

Polyunsaturated fatty acids (PUFA) have a role in many physiological processes, including energy production, modulation of inflammation, and maintenance of cell membrane integrity. Polyunsaturated fats (PUFAs) include the omega-6 and omega-3s, essential for life and there are health benefits to consuming both in the appropriate ratios.

Research has been focused on omega-6/omega-3 ratios and there is a clear benefit to keeping this ratio at 4:1 or less. While this is the beneficial zone, most people consume these fats in a 10:1 ratio. Many in the industrialized world are reaching levels as high as 25:1. These large ratios in favor of omega-6 are unhealthy and lead to significant inflammation and increased risk for detrimental health effects.

Several GWAS studies have looked at the genetic variations that impact serum levels of PUFAs in the population. Certain variations correlate with rate limiting enzyme activity in the conversion to beneficial forms while others can predict weight loss response to percentages of PUFAs in the diet.

INTERPRETATION:

You do well with polyunsaturated fat. While moderate omega-6 intake is okay, you want to focus on increasing Omega-3 to optimize your physical and cognitive performance.

RECOMMENDATIONS:

Add high quality wild-caught fish to your diet, and strongly consider taking fish oil and DHA supplementation.
I recommend testing Omega-6 to Omega-3 Ratio when you do blood labs. Aim between 4:1 and 1:1

MONOUNSATURATED FATS

GENETIC DATA

GENE	GENO TYPE
ADIPOQ(1)	AG
ADIPOQ(2)	GG
APOA5	AA
BDNF	CC
TNF	GG
FAAH	CC
LPL	TT
IL-1B	AG

MODERATE

MUFA INTAKE

There are currently no strict recommendations on MUFA intake but suggestions range from 12-25% of total calories.

Monounsaturated fatty acids (MUFA) have a long list of studies in the scientific literature supporting the health benefits. Reported health benefits include; decreased inflammation, decreased cancer rates, decreased heart disease, and weight loss.

MUFA is suspected to be the major health benefit of the Mediterranean diet where some traditionally consume as much as 40% of their total calories from olive oil, a major source of MUFA.

MUFA are mainly omega-9 fatty acids but also includes the omega-7 fatty acids. The main sources of MUFA in our diets include; oils, nuts, meats, salmon, and avocado.

MUFA SOURCES:

- Olive oil
- Macadamia nut oil
- Avocado Almonds
- Macadamia nuts
- Beef
- Salmon
- Pumpkin seeds
- Chicken

INTERPRETATION:

Your genetics suggest that you do well with monounsaturated fat. Olive oil and avocados are great sources. This can make up a large portion of your diet

RECOMMENDATIONS:

Cook your food in olive oil instead of vegetable oils or coconut oil. It will be the most effective for you and help you decrease inflammation. Anywhere from 10-25% of your diet is effective.

PROTEIN

GENETIC DATA

GENE	GENO TYPE
FTO(1)	AT
FTO(2)	TT
LPIN1	GG
BDNF-AS	AA
TFAP2B	AG

LOW

OPTIMAL INTAKE

Consider the biologic value of proteins. The biologic value is a measure of the proportion of absorbed protein from a food which becomes incorporated into the proteins of the body.

Protein is an important macronutrient that provides the amino acid building blocks for structures, enzymes, antibodies, and hormones. There are 20 amino acids that the body uses to create millions of different proteins and of those, ten are considered essential, meaning that we are not able to make them and we must consume them in our diets.

There are many GWAS that look at how our mix of macronutrients can affect our gene expression to create a specific response. Most of these studies have focused on body composition. This means that we can look at certain genetic variations that correlate with an outcome of changing the way certain genes are expressed that relate to obesity, fat storage, and body composition.

Some people will respond better to a diet with a higher percentage of calories from protein, while other do better with a lower percentage. This is a complex network of gene interactions and there are ways to epigenetically shift the expressions of these genes to achieve desired outcomes.

INTERPRETATION:

For weight loss, aim for low relative protein intake.
In this context, "low" means 15-25% of your total calories.

RECOMMENDATIONS

For you, that means that the optimal amount will be around 80-125g of protein each day. Find high quality meat to add to your diet. Look for adjectives like "grass-fed" "grass-finished" "organic" "hormone-free" "gmo-free" etc. to make sure that you're getting the best quality. Consider protein shakes to get enough protein throughout that day as long as they don't trigger grain sensitivity symptoms.

PLANT STEROLS

GENETIC DATA

GENE	GENO TYPE
ABCG8 (1)	TT
ABCG8 (2)	CC
ABCG8 (3)	TT
CETP	AG
ABCG5(1)	GG
ABCG5(2)	CG

LOW

PLANT STEROL RISK

SUGGESTED

PLANT STEROL BENEFIT

Plant sterols have been reported to lower LDL and triglycerides.

Plant sterols is the term for phytosterols and phytostanols, regardless of biological source. These are cholesterol-like molecules found in all plant foods, with the highest concentrations occurring in vegetable oils. They are absorbed only in trace amounts in normal circumstances, but some individuals possess the genetics to absorb greater amounts. Plant sterols work by inhibiting the absorption of intestinal cholesterol basically through competition for receptors and uptake. This also happens if they get absorbed into our blood stream. This can increase cardiovascular risk.

Generally, the amount of plant sterols taken in through dietary sources are tolerable but excess amounts are a potentially harmful. Supplement sources can come in a variety of forms; sterols, stanols, phytosterols, beta-sitosterol, campesterol and stigmasterol.

INTERPRETATION:

Low risk of being negatively affected by eating certain plants and nuts.

RECOMMENDATIONS:

Plants and nuts will likely be beneficial in lowering triglyceride levels.

METABOLISM

GENETIC DATA

GENE	GENO TYPE
GCKR	CC
LEPR	n/a
PPARGC1A	CC
MC4R	TC
UCP2	CC
FTO(4)	TG
UCP2(2)	GG
FTO(6)	TG

INCREASED

ESTIMATED RMR

In this report, we look at genetic variations and how they tend to affect resting metabolic rate (RMR). RMR is a complex combination of genetics and environment and the genetics can be modified through epigentic influences.

The basal metabolic rate calculators (BMR) are rough estimates and should only be used as guides. In fact, the weight variable in the equation adds even more variability since it is most accurate when using the fat free mass (FFM), and FFM can be very different even for individuals that weigh the same in total body weight.

The BMR calculators are reported in some studies to be as much as 700 kcal off even when using FFM. BMR does not take into account the number of calories burned in daily activity, only resting.

INTERPRETATION:

Great metabolism genetics.

RECOMMENDATIONS

Based on your goals, to further improve your mitochondrial and metabolic function, consider the following recommendations:
Exercise, high quality sleep, intermittent fasting, cold exposure (ice baths/cold showers)
Supplements: NR, Resveratrol, MitoQ, Berberine, EGCG (green tea extract) and D-Ribose.

MACRONUTRIENT WORKSHEET

CLIENT DEMOGRAPHIC:

Height: 73 inches

Weight: 155 lbs

Age:

Gender: Male

MACRONUTRIENT DAILY GOALS:

Carbohydrates	220-300	grams/day
Protein	80-135	grams/day
Fats	75-100	grams/day

BASAL METABOLIC RATE:

(estimated) 2200 Calories/Day

Probability Based on Genetic Data

CARBS: 45%

FATS: 30%

PROTEIN: 25%

Recommended calorie mix is based on a combination of genetics and your lifestyle evaluation

Recommended Calorie Mix

CARBS:40-55%

FATS: 30-40%

PROTEIN: 15-25%

TOTAL DAILY CALORIE GOAL: 2200 CALORIES/DAY

RECOMMENDATIONS

Bloodwork:
Consider checking Blood sugar and inflammation markers, as well as Omega-6:Omega-3 ratio.

Supplementation:
-Berberine for insulin resistance, and enhanced metabolism
-Consider Metformin for decreasing blood sugar markers,inflammation, and insulin resistance
-Fish Oil, especially DHA for inflammation, cognitive function, energy, metabolism, and healthy Omega-3 levels
-Nicotinamide Riboside, D-ribose, and/or Green Tea (Matcha) for metabolism boost
-Magnesium Glycinate and/or Vitamin B6 for Grain sensitivity

Nutrition:
-moderate complex carbs and fiber
-Avoid processed foods and look for food with labels like "non-gmo, organic, grass-fed, hormone-free, wild-caught, pasture-raised" etc. to ensure you're eating high quality non-inflammatory foods
-Limit Saturated fat <10%
-Add Wild-caught fish and fish oil for Polyunsaturated fat
-Olive Oil, avocados and macadamia nuts for plenty of monounsaturated fat
-80-120g of good protein a day.
-Protein powder: True Nutrition, Ascent, Garden of Life, Ample, and Vega are all great companies. Whey protein is ideal for muscle building, but pea protein or collagen protein can work too if whey doesn’t sit well in your stomach or triggers sensitivities.

CENTER FOR HUMAN POTENTIAL
APEIRON

Genomic Supplementation Report

Client: Sample

VITAMIN B12

GENE	GENO TYPE
FUT2 (1)	AG
FUT2 (2)	AG
FUT(3)	AG
MTR	AG
VDR taq	AG
COMT	AG
TCN1	GG
MTRR A66G	GG
MTHFR 677T	AA

Since your body can't make vitamin B12, you should get it either from supplements or food sources. Foods that contain vitamin B12 are all animal products or have been fortified with B12. See end of report for foods high in B12.

TYPICAL SUPPLEMENTATION NEED

It's estimated that 40 percent of American's don't get enough vitamin B12. Vitamin B12 is absorbed through the stomach lining typically in the form of animal-based foods.

Benefits of Vitamin B12

B12 deficiency can contribute to fatigue and brain fog.

Benefits to increasing your vitamin B12 intake, include

- Increased energy – Because your body needs B12 to convert carbohydrates into glucose, it increases your overall energy and reduces fatigue.
- Improved brain function – Vitamin B12 helps make DNA and keep your nervous system healthy by reducing depression, stress levels, and reducing brain shrinkage.
- Healthy digestive system – B12 helps the gut and prevents heart disease by curbing cholesterol levels, protecting against stroke, and high blood pressure.

INTERPRETATION:

Despite "Typical need," you're likely to have an increased need for B12 due to low absorption in the gut.

RECOMMENDATIONS

5mg of sublingual (under the tongue) Methylcobalamin B12 is an easy way to make sure that you're getting enough B12.

VITAMIN B6

GENE	GENO TYPE
NBPF3	CT
ALPL(1)	..
ALPL(2)	AG

If you'd like to increase your vitamin B6 intake, you can do so naturally by adding certain foods to your diet. Foods that are notably high in B6 are listed at the end of this report. B6 is involved in over 100 metabolic processes.

INCREASED

SUPPLEMENTATION NEED

Vitamin B6, also called pyridoxine, helps your body turn food into energy, supports adrenal function, maintains a healthy nervous system, is important in metabolic processes, and supports the healthy development in babies' brains during pregnancy and breastfeeding.

Considered one of the most common vitamin deficiencies, vitamin B6 is consumed through diet or supplements.

Common symptoms of low vitamin B6 are irritability, depression, and anxiety. Some scientists believe that the levels for considering someone vitamin B6 deficient should be increased.

Benefits of Vitamin B6

- **Adrenal function** – Through regulating hormones, B6 helps you battle stress, stabilize your mood, and stay happy.
- **Metabolism** – Crucial to your hundreds of metabolic processes, B6 helps your body turn food into energy.
- **Healthy nervous system** – Vitamin B6 is often referred to as the happy vitamin because it helps make serotonin and norepinephrine, which impact your mood.
- **Digestive support** – B6 helps maintain healthy digestive processes.

INTERPRETATION:

Your genetics show an increased need for B6. Since you're also likely to be sensitive to grains, this is especially beneficial

RECOMMENDATIONS

Consider vitamin B6 supplementation or finding a good multivitamin such as the Apeiron multivitamin to ensure sufficient levels.

VITAMIN A

GENE	GENO TYPE
BCMO1(1)	CC
BCMO1(2)	TA
BCMO1(3)	AG
BCMO1(4)	AG
BCMO1(5)	GT
BCMO1(6)	TG

Vitamin A is a nutrient that is easy to add to your diet with both supplements and food. Some of the best food sources are listed at the end of this report, add to your meals for a boost in skin, eye, and teeth health.

VERY LOW

CONVERSION EFFICIENCY

Vitamin A is also called beta-carotene or retinoic acid. When it's found in food it's in the form of beta-carotene. In supplements, vitamin A can be in either form or both. Beta-carotene is the naturally occurring form that is converted by the body into retinoic acid, which is its usable version.

The gene BCMO1 is what the body relies to properly convert beta-carotene into its usable form. Your body relies on this conversion of vitamin A for healthy maintenance of the heart, kidneys, lungs, and eyes.

Benefits of Vitamin A

Improved immune system – Boosts the immune system and helps fight infection by increasing the lymphocytic responses against antigens. It also helps mucus membranes stay moist, which helps strengthen white blood cell activity

Healthy skin – With the ability to trap free radicals and toxins, vitamin A keeps your skin supple & healthy.

Increased tooth strength – Through forming a hard material just beneath the surface of your teeth called dentin, vitamin A keeps your teeth strong.

Eye health From moisture to macular health, it supports your eyes.

INTERPRETATION:

Very low conversion from the inactive to the active form of vitamin A.

RECOMMENDATIONS

Consider eating foods listed at the end of the guide or taking a multivitamin such as the Apeiron multivitamin that have sufficient quantities of both Palmitate (the active form) and Beta-carotene.

SELENIUM

GENE	GENO TYPE
GPx1	AG
SEPP1	CC
AGA	AC
BHMT	TT
MST1	AA
DMGDH	CC

While you can add selenium to your diet with a supplement, there are several foods that are naturally high in selenium. Some of these seleniumrich foods are listed at the end of this report.

INCREASED

SUPPLEMENTATION NEED

Selenium is an antioxidant, meaning it protects your body from harmful free radicals and oxidative stress. This delays cell damage and helps protect your body from oxidizing agents caused by many diseases and pollutants.

As an immunomodulator, Selenium is a more potent antioxidant than vitamins A, C or E. It's nutritionally essential for everyone, supports thyroid hormone metabolism, and protects against infections.

Benefits of Selenium

Thyroid support – Selenium is an important cofactor for three of the four thyroid hormone deiodinases, which activate and deactivate thyroid hormones and metabolites.

DNA repair – By neutralizing free radicals, selenium protects DNA, preventing serious damage.

Metal detoxification – Studies have shown that organic selenium supports the excretion of the harmful element mercury.

Reproductive health – Selenium is vital for both male and female reproductive health. In men, it enables sperm movement. In women, low selenium can negatively impact fertility and fetal development

INTERPRETATION

You have an increased need for selenium supplementation due to reasons that will also come up again in later panels: Glutathione production, and Heavy Metal/Mercury Detox. It's important to stay within a healthy range. Over 400mcg/day is too much, but you want about 100-200mcg.

RECOMMENDATIONS

Eat 2-3 Brazil nuts a day or find a good multivitamin (such as the Apeiron Multivitamin) that gives you a safe amount of selenium (about 100mcg)

MAGNESIUM

GENE	GENO TYPE
CNNM2	GG
MUC1	CC
DCDC5	TC
Shroom3	AG
TRPM6(1)	TC
TRPM6(2)	CC

Magnesium is found in both plants and animalbased foods, making it easy to add to your diet. Foods that are rich in magnesium are listed at the end of this report.

There are a lot of delicious foods that contain magnesium so increasing your intake shouldn't be a problem. Though, if you think you are magnesium deficient you can also take it in supplement form.

INCREASED SUPPLEMENTATION NEED

Magnesium one of the seven macronutrients that is needed by your body in relatively high amounts. It's recommended that you consume at least 100 milligrams per day. Magnesium is vital to over 300 enzymatic reactions in your body including metabolism, transmission of nerve impulses, and synthesis of fatty acids and proteins. It impacts several bodily systems and can even affect your mood.

Too much magnesium can cause diarrhea and upset stomach.

Benefits of Magnesium

Bone strength – Magnesium helps assimilate calcium into your bones by activating vitamin D in your kidneys.

Healthy metabolism– Essential co-factor in many metabolic processes especially carbohydrate processing.

heart health – Magnesium is responsible for keeping your heart muscles healthy and strong. It also helps with the transmission of electrical signals throughout the body. Proper magnesium levels have shown to lower artery calcification, hypertension, and atherosclerosis (fatty buildup on artery walls).

Anxiety – Low magnesium levels have been shown to increase anxiety.

Gut – Magnesium works as a stool softener and can relieve constipation naturally.

INTERPRETATION:

You have an increased need for supplementation due to loss of magnesium in the gut. It's a ubiquitous vitamin that is necessary in all organs, and 75% of the US population is likely deficient.

RECOMMENDATIONS

400mg/day of magnesium is a healthy amount for men. I suggest Magnesium Threonate if you want to focus on cognitive performance or Magnesium Glycinate if you want to improve your sleep (and combat grain sensitivity).

CHOLINE

GENE	GENO TYPE
BHMT	GG
CHDH	TT
MTHFD1	GG
PEMT	TC
CHKA	AA

our liver produces choline, but not in sufficient quantities. Add choline to your diet through food or through supplements. Both vegetables and animal products contain choline. Not surprisingly, beef liver is the highest source of choline. Foods high in choline are listed at the end of this report.

Increasing your intake of these food or adding choline to your diet through a supplement can improve overall health.

TYPICAL SUPPLEMENTATION NEED

Your body can produce choline, although, it doesn't produce sufficient quantities of this essential nutrient to maintain optimal health and less than 10 percent of adults get enough choline in their diet.

Some risks of choline deficiency include muscle damage, anxiety, brain fog, and fatty liver.

People that are at risk for choline deficiency include:

- Pregnant women
- Choline depleted diets (plant based diets)
- People with genetic variations

**It's particularly important for pregnant women and babies to get enough choline to ensure healthy brain development.

Benefits of Choline

Cell structure – Your body relies on choline to make the fats that help maintain the structural integrity of all cell membranes.
Cell messaging – Choline assists with the production of compounds that act as cell messengers.
Fat transport and metabolism – Insufficient choline levels can cause fatty liver.
DNA synthesis – Choline, vitamin B12, and folate are three vital nutrients in DNA synthesis.
Nervous system health – Acetylcholine, a neurotransmitter involved in memory, muscle movement, and regulating heartbeat, is derived from choline.

INTERPRETATION:

Despite "typical" need, you have a genotype that correlates with decreased liver function with choline deficiency

RECOMMENDATIONS

Eating 2-3 runny egg yolks each week provides enough choline. However, based on your goals, you may prefer to supplement with Alpha GPC or CDP Choline with uridine.

VITAMIN C

GENE	GENO TYPE
SLC23A1(1)	CC
SLC23A1(2)	CC
SLC23A2	AA

Citrus foods, such as oranges, are known to have high vitamin C levels but there are many foods that have high concentrations of vitamin C. These are listed at the end of this report. By adding these fruits and vegetables to your diet or increasing your intake you can generally not require supplementation.

TYPICAL SUPPLEMENTATION NEED

Also known as ascorbic acid, vitamin C is a nutrient that plays several key roles in bodily functions. Vitamin C is a powerful antioxidant, trapping free radicals and preventing the harmful effects of toxins. It isn't produced by the body naturally and must be consumed in the form of fruits and vegetables.

People at risk for inadequate levels of vitamin C are those with particular lifestyle habits, genetics, or diets lacking in vitamin C.

Benefits of Vitamin C

Collagen synthesis – VVitamin C helps repair and regenerate tissues. Maintains healthy skin and connective tissue.

Protection against heart disease – Through increasing the body's level of glutathione, vitamin C protects the arteries.

Iron absorption – Assists iron absorption, vitamin C prevents anemia.

Cholesterol and triglyceride reduction – Vtamin C reduces the risk of heart attack and stroke.

Blunts oxidative stress – In diseases states, vitamin C has shown to help reduce cellular damage by free radicals.

INTERPRETATION:

Unlikely to need regular supplementation.

RECOMMENDATIONS

If you're trying to improve your immune system for a short period of time to combat illness, then keep dosage below 1-2g/ day.

VITAMIN E

GENE	GENO TYPE
CD36	TC
SCARB1	GG
ZPR1	CC
GSTP1	AA
TNF	GG
IL10	TC

Vitamin E is relatively easy to add to your diet in plant-based forms. Foods that are high in Vitamin E are listed at the end of this report.

INCREASED

SUPPLEMENTATION NEED

HIGH

INFLAMMATION RISK

Vitamin E is a fat-soluble antioxidant that plays a vital role in many aspects of your health.

Vitamin E is a term that includes eight compounds in two subgroups (tocopherols and tocotrienols) that each vary in biological activity. Alpha-tocopherol is the only form of the eight that is readily absorbed and used by your body.

Your liver is primarily responsible for using the alpha-tocopherol form of vitamin E taken in through food, supplements, and by converting it from other vitamin E forms.

Benefits of Vitamin E

Helps store vitamins A, K, iron, and selenium – Vitamin E helps maintain sufficient levels of many essential nutrients.
Supports the formation of red blood cells – ed blood cells rely on vitamin E to strengthen their interior lining, which is another way it toughens the immune system.
Keeping skeletal, cardiac, and smooth muscles healthy – Vitamin E is important for both the structural functional and maintenance of these.
Prevent eye damage – Studies have suggested that relatively high vitamin E intake may reduce the risk of macular degeneration and cataracts in elderly individuals.

INTERPRETATION

Despite "increased" need, you have a high inflammation risk from vitamin E supplementation.

RECOMMENDATIONS

Vitamin E supplementation, which is usually known for anti-inflammatory properties, will likely cause inflammation for you. Keep it below 400IU or 180mg, but otherwise you don't need to be concerned.

VITAMIN D

GENE	GENO TYPE
GC	TG
CYP2R1	AA
CYP2R1(2)	GG
DHCR7	AC
VDR fok	AA
CYP27B1	TT
CYP24A1	AG
Klotho	TT
VDR bsm	CC
VDR taq	AG
VDR apal	AA

Vitamin D is not just a matter of getting it from food. Sunlight is needed to adequately convert Vitamin D to usable forms.. It is important to consume foods which are high in vitamin D, listed at the end of this report.

INCREASED

SUPPLEMENTATION NEED

YES

SUNLIGHT BENEFIT

NO

TESTING CAUTION

Vitamin D is a fat-soluble nutrient that is not readily found in many foods. An estimated 70 percent of the population is thought to be vitamin D deficient. This is concerning because it's a nutrient that's responsible for regulating over 1000 genes in the human genome.

From a genetic standpoint, people tend to vary in their ability to process vitamin D. This means that there's a difference in the baseline amount needed to maintain healthy vitamin D levels from person to person.

Benefits of Vitamin D

Bone health – Through increasing calcium and phosphorus absorption, vitamin D strengthens bones.
Prevention of diabetes – Studies have shown that vitamin D can decrease your risk of getting both Type 1 and Type 2 diabetes.
Heart health – Studies have shown vitamin D deficiency as a risk factor for congestive heart failure and heart attacks.
Mood regulator – Vitamin D is thought to reduce or prevent depression.
Muscle growth – Vitamin D has been shown to aid in muscle growth and retention in both adults and the elderly.

INTERPRETATION

Increased need for vitamin D supplementation. Based on your genetics, your body should easily convert Sunlight into Vitamin D as well.

ECOMMENDATIONS

Check vitamin D levels and consider daily supplementation of 5000 IUs of D3 mixed with 50-100mcg of Vitamin K2 or do a weekly super-dose of 50,000 IU of vitamin D3.

VITAMIN K

GENE	GENO TYPE
APOE(1)	TT
APOE(2)	CC

INCREASED

SUPPLEMENTATION NEED

Vitamin K includes a family of compounds, including vitamin K1 and vitamin K2. Also known as phylloquinone, vitamin K1 is found in plants, mostly leafy green vegetables. Vitamin K2 or menaquinones, is usually of bacterial origin and can be found in some animal-based and fermented foods but is mostly converted by the large intestine or liver from vitamin K1.

Many people get an adequate amount of vitamin K through their diet. It's also present in most multivitamin supplements. Genetics can be an active player in this process and can be predictive of absorption and conversion.

Benefits of Vitamin K

Bone health – In a study in the Netherlands, vitamin K2 was three times more effective in raising osteocalcin than K1, which is important to bone metabolism.
Blood clotting – Vitamin K is essential to blood clotting. In fact, in studies of severe vitamin K deficiency, clotting was almost impossible.
Supporting the efficacy of vitamin D – Vitamin K improves the impact of vitamin D when they are taken in combination.

INTERPRETATION

Increased need for Vitamin K2 supplementation.

RECOMMENDATIONS

Consider supplementation with a Vitamin D3/K2 mix.

FOLATE

GENE	GENO TYPE
MTHFR 677T	AA
MTHFR 1298C	TT
DHFR(1)	TT
FOLR1	GG
DHFR(2)	ID
SLC19A1	CT

TYPICAL SUPPLEMENTATION NEED

Note that there is a difference between folate and folic acid when you look at supplements or fortified foods. Folic acid is a synthetic form that requires the body to convert to usable form - folate. Certain genetic variants can create a risk of potential adverse outcomes with excess folic acid.

Folate or vitamin B9 is a water-soluble nutrient that is available in many foods and typically found in multivitamin supplements. Getting enough folate is important to cognitive function, cardiovascular disease, cancer, birth defects, and depression.

While it's difficult to get too much folate from food, it's possible to take too much folic acid in the form of supplements or fortified foods.

Crucial parts of your body – your brain, heart, and all the way down to your DNA – rely on sufficient folate levels for optimal health.

Benefits of Folate

DNA synthesis and repair – Functioning as a coenzyme, folate helps with the synthesis of DNA and RNA and the metabolism of amino acids.

Tissue growth – Folate's role in synthesis makes it essential to tissue and cell growth.

Cardiovascular health – Studies have shown that folate encourages normal cholesterol levels.

Neurological health – Most observational studies show that higher folate levels correlate with low Alzheimer's disease and dementia.

INTERPRETATION

Despite "typical" supplementation need, there are some strong reasons to follow recommendations

RECOMMENDATIONS

Check Homocysteine levels, consider Methylfolate supplementation.
AVOID folic acid supplementation.

THIAMINE

GENE	GENO TYPE
SLC19A3	CC

INCREASED

SUPPLEMENTATION NEED

Thiamine deficiency can cause difficulty digesting carbohydrates. In severe deficiencies this allows a substance called pyruvic acid to build up in the bloodstream, causing a loss of mental alertness, difficulty breathing, and potentially heart damage.

Thiamine is a vitamin that is also referenced as vitamin B1. Thiamine is essential to many body functions, including nervous system integrity, muscle function, digestion, and carbohydrate metabolism. Very little thiamine is stored in the body and depletion can occur quickly when not supplied through diet or supplementation. It is sometimes called an "anti-stress" vitamin because it can strengthen the immune system and improve the body's ability to withstand stressful conditions.

Benefits of Thiamine

- **Energy production** - B1 is responsible for converting sugar into energy. The vitamin acts as a co-enzyme in oxidizing sugar to produce energy for the smooth functioning of the body organs, especially the heart, brain, lungs, and kidneys.
- **Improves brain function** - It ensures smooth functioning of the brain and helps improve memory and concentration. Vitamin B1 helps relieve stress and also helps strengthen the nerves.

INTERPRETATION

Despite "Increased" need, sufficient thiamine is easily found in nuts and multivitamins

RECOMMENDATIONS

Consider eating some nuts or taking a good multivitamin.

COPPER

GENE	GENO TYPE
SELENB1	TG
ATP7B	GG

TYPICAL

SUPPLEMENTATION NEED

Copper is a micronutrient that is involved in many processes in the body and can easily become deficient due to the lack of intake in even a healthy diet. The body cannot produce copper on its own so it requires intake in the diet or through supplementation. It is also a micronutrient that has a narrow range of safety - very common to be deficient and easy to become toxic if over-supplemented. Most whole food sources are very low in copper.

Benefits of Copper

Cognitive function - Too little or too much copper can have a negative impact on the brain. Ideal levels promote growth and development of brain pathways.

Thyroid health - An important cofactor in promoting optimal thyroid levels and a healthy thyroid is important in keeping adequate absorption of copper from the gut.

Long-term health - Copper is a requirement for ongoing maintenance & repair DNA.

Bone - Copper is important in maintenance and repair of bone and cartilage. Deficiencies can lead to low bone density.

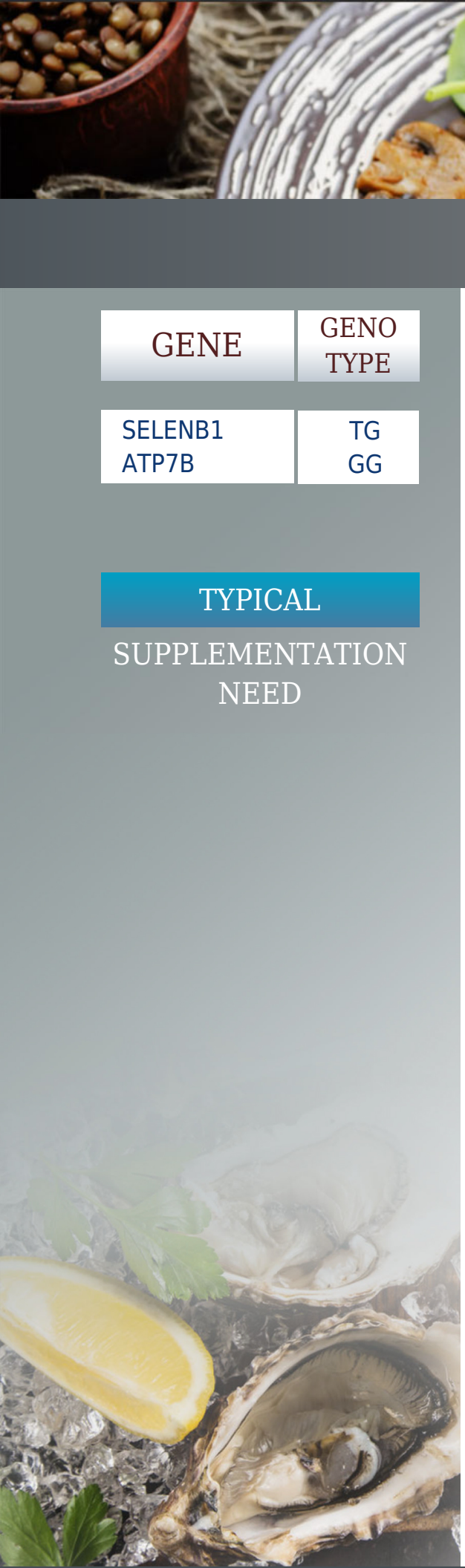
Blood - Lack of copper can also lead to anemia.

Skin & hair - Copper is involved in the production of melanin, a pigment responsible for skin and hair color.

INTERPRETATION

Low risk of high or low copper levels

RECOMMENDATIONS



ZINC

GENE	GENO TYPE
CA1	AG
PPCDC(1)	TC
PPCDC(2)	CC

TYPICAL

SUPPLEMENTATION NEED

Zinc is considered an essential trace element and is involved in assisting at least 100 different enzymes in the human body. It is also a common micronutrient deficiency. Deficiencies can lead to many health issues and optimal levels are essential to thrive. Plant based sources of zinc generally provide significantly lower bioavailability than animal based food sources.

Benefits of Zinc

Immunity -Zinc is an essential nutrient for our immune system..

Cognitive function - Essential for optimal communication between neurons in the brain.

Common cold - Zinc has been shown to lessen the severity and duration of the common cold.

Wound healing - From decreasing inflammation and reducing bacterial growth to helping maintain skin integrity.

Taste & smell - The taste and smell are reliant on zinc for proper function and has been shown to heighten these senses.

Weight loss - Deficiencies can lead to overeating. It works through the appetite hormone ghrelin to decrease the urge to overeat.

INTERPRETATION

No need for zinc supplementation.

RECOMMENDATIONS

IRON

GENE	GENO TYPE
TMPRSS6	AG
TF	AA
TFR2	AA
HFE(1)	CC
HFE(2)	GG

TYPICAL

SUPPLEMENTATION NEED

TYPICAL

RISK FOR EXCESS

Iron is essential mineral and is the world's most common nutritional deficiency disease. Deficiency is most prevalent among children and women of childbearing age. Almost 10% of women in developed countries are iron deficient.

Fatigue, insomnia, hair loss, and ice crunching are common signs of deficiency. Inadequate intake of vitamin C can can contribute to iron malabsorption. Plant based iron is not incorporated as well as heme-iron from animal sources.

Benefits of Iron

Hemoglobin production - Dietary iron is a critical component in the formation of hemoglobin and oxygen transport.
Oxygen transport - A form of hemoglobin found in muscle cells is myoglobin. Myoglobin carries oxygen from hemoglobin and diffuses it throughout muscle cells.
Muscle function - Iron is critical for oxidative metabolism in the brain and it is a co-factor in the synthesis of neurotransmitters. Insufficient iron in the diet is associated with decreased brain iron and with changes in behavior and cognitive functioning.

INTERPRETATION

No risk of low or excess iron levels.

RECOMMENDATIONS

NITRIC OXIDE

GENE	GENO TYPE
NOS1(1)	CC
NOS1(2)	AG
NOS2	AG
NOS3(1)	AG
NOS3(2)	TC
NOS3(3)	..

HIGH

SUPPLEMENTATION NEED

Nitrates have had a negative connotation over the years due to the suspicion of causing health problems such as stomach cancer. This was due to their association with the nitrosamines that could be found in cured and smoked meats as well as fermented foods. In many countries the amount of nitrates in processed meats has been substantially reduced and they add vitamin C which reduces the chances of nitrosamine formation during high heat cooking.

Our bodies are capable of producing nitric oxide but some genetic variants can alter that ability. Nitrates are the natural forms of nitric oxide that the body can utilize.

Kale and spinach will generally have substantially more nitrate content than a hot dog or bacon.

80% of the nitrates in our diet come from vegetables. Interestingly, organic vegetables have less nitrates than conventionally farmed food due to reduced use of nitrogen based fertilizers.

Benefits of Nitric Oxide

Cardiovascular – Nitric oxide, endogenously produced or from nitrates can lower blood pressure and dilate blood vessels.

Exercise – Nitrates have been shown to decrease oxygen requirements of muscles during exercise and lead to greater time to fatigue.

Brain – Nitric oxide is a potentent antioxidant in the brain and it serves a function as a neurotransmitter.

Immunity – Nitric oxide is used by our immune cells to kill invading bacteria.

INTERPRETATION

Strong need for supplementation.

RECOMMENDATIONS

Check nitric oxide levels with inexpensive tester strips.
Consider a beet root powder as a daily or pre-workout supplement to boost nitric oxide.
Beet Elite and HumanN are great sources for beet root powder.

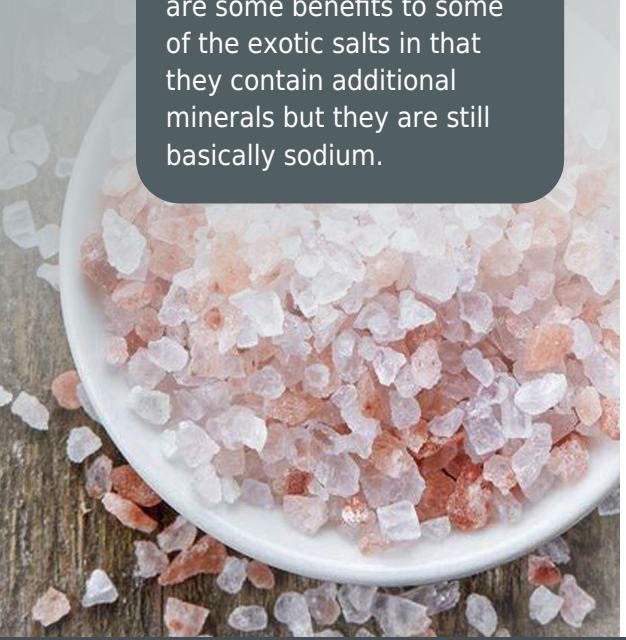
SODIUM

GENE	GENO TYPE
ADD1	GG
ACE del	AG
NEDD4L	AG
WNK1	TG

LOW

SENSITIVITY RISK

It is an incorrect assumption that other forms of salt (something other than table salt) might be better for you. Salt as a chemical is sodium chloride and we are talking about sodium sensitivities here so table salt and sea salt or mineral salt will all still contain sodium. There are some benefits to some of the exotic salts in that they contain additional minerals but they are still basically sodium.



Sodium or salt is another nutrient that has had its share of bad press. Sodium balance is one of the most exquisitely monitored systems in the body. Because sodium is so important to the maintenance of health, it is finely tuned to a very narrow and precise level. Taking excess sodium for most people will not result in health problems, assuming the body is functioning well.

One aspect to keep in mind is the genetics we possess may impart an increased risk for taking excess sodium in the diet. There are genetic variations that can result in an alteration in the processing pathways which can create potential adverse reactions to too much salt in the diet.

Types of Sodium:

Table salt: sodium chloride and iodine

Sea salt: slightly lower sodium plus calcium, potassium, iron oxide (pink color)

Himalayan salt: slightly lower sodium plus calcium, potassium, iron oxide (pink color)

Celtic salt: slightly lower sodium and trace minerals

INTERPRETATION

Low risk of sodium sensitivity.

RECOMMENDATIONS

In general, we suggest that you use Himalayan salt or celtic salt when salting your food.

CAFFEINE

GENE	GENO TYPE
CYP1A2(1)	CC
CYP1A2(2)	CC
AHR	TC
ADORA2A	CT
ADA	TC

SLOW

METABOLISM

LOW

ANXIETY RISK

Metabolism – How well do we metabolize caffeine? The half-life of caffeine is 5.7 hours.

Anxiety – How does your brain respond to caffeine? Brain wave patterns can have variable responses to caffeine depending on your individual genetics.

Sleep – Caffeine can assist some people with shaking off a nights sleep and clearing up the brain fog; while others will experience sleeplessness from even small doses of caffeine.

Caffeine is one of the most researched substances in the history of science. Good or bad? The answer may actually reside in your genetics. The interactions of caffeine in our body is a complex process and requires a full systems look to see if it is truly good or not so good for each individual.

Benefits of Caffeine

Energy – Caffeine can improve daily energy by interfering with a substance called adenosine.
Fat burning – Caffeine is one of only a handful of natural substances that has been proven to improve fat loss.
Physical performance – Caffeine is a true performance enhancing substance.
Reduced risk of neurodegenerative diseases - Coffee itself has been linked to reduced risk of cognitive decline.

INTERPRETATION

Likely to metabolize caffeine 2-4x slower than average.
Unlikely to have anxiety risk associated with caffeine intake

RECOMMENDATIONS

Limit coffee consumption to 1 cup a day or less. Stop drinking caffeine by noon to optimize sleep and energy cycles.
Consider switching to other drinks such as tea.

INTERPRETIVE NOTES:

Blood Labs:
-B12 levels
-Vitamin D3 levels
-Homocysteine

Most Important:
-Magnesium: aim for 400mg/day of Magnesium Threonate (For cognition) or Magnesium Glycinate
-Vitamin D3 and Vitamin K2: Get a good combo of these two. These shows up later in Bone Density.
-Selenium: Eat 2-3 brazil nuts or use the Apeiron multivitamin. This shows up as important in the detox panel too.
-Vitamin B6: Available in the Apeiron Multivitamin, good for sleep and grain sensitivity too.

Important:
-Nitric Oxide: Beet Root Powder, Beets, Kale, or Spinach
-Choline: 3 runny egg yolks each week, or Alpha GPC
-Vitamin B12 as methylcobalamin, (5mg under tongue)

Good Ideas:
-Vitamin A (as palmitate), Thiamine and Folate could use some help. All of these are available in the right doses in the Apeiron multivitamin.

VITAMIN FOOD SOURCES:

Vitamin B12:

- Liver • Salmon • Milk • Yogurt • Tuna • Mackerel • Sardines • Red meat • Raw cheese • Eggs

Vitamin B6:

- Brewer's yeast • Bananas • Milk • Cheese • Eggs • Fish • Sunflower seeds • Carrots • Spinach • Peas • Legumes • Potatoes

Vitamin A:

- Fish liver oil • Cream • Egg yolk • Beef liver • Cheddar cheese • Butter • Sweet potato • Carrots • Broccoli • Mango • Spinach • Pumpkin • Apricot • Peach • Papaya • Collard greens

Selenium:

- Brazil nuts • Tuna • Halibut • Beef liver • Turkey • Sardines • Sunflower seeds • Pork • Mushrooms

Magnesium:

- Dark leafy greens • Sesame seeds • Brazil nuts • Mackerel • White beans • Quinoa • Avocados • Yogurt • Bananas • Dark chocolate

Choline:

- Beef liver • Eggs • Chicken breast • Cauliflower • Broccoli • Mushrooms • Soybeans • Dark leafy greens • Shellfish • Asparagus • Brussel sprouts • Bok choy • Cod

Vitamin C:

- Bell peppers • Guava • Dark leafy greens – especially turnip greens • Kiwi • Broccoli • Strawberries • Tomatoes • Peas • Papaya • And of course, citrus fruits – oranges, grapefruits, lemons

Vitamin E:

- Almonds • Sunflower seeds • Swiss chard • Pine nuts • Broccoli • Mustard greens • Avocado • Spinach • Turnip greens • Kale • Plant oils • Hazelnuts

Vitamin D:

- Fatty fish – Tuna, mackerel, salmon • Beef liver • Cheese • Egg yolks • Cod liver oil • Fortified drinks – Milk and sometimes orange juice • Fortified foods – Cereals and grains

Vitamin K:

- Spinach • Kale • Turnip greens • Collards • Swiss chard • Mustard greens • Parsley • Romaine • Brussel sprouts • Broccoli • Cauliflower • Cabbage

Folate:

- Beef liver • Spinach • Broccoli • Bananas • Strawberries • Oranges • Beans • Avocado • Tomatoes • Beets • Celery • Asparagus • Legumes • Yeast • Cereal • Mushrooms • Fish • Eggs

Nitric Oxide:

- Spinach • Kale • Beets • Carrots • Legumes • Celery • Eggplant • Ham • Bacon • Pastrami • Salami • Hot dogs • Sausages

Thiamine:

- Beef • Brewer's yeast • Legumes (beans, lentils) • Milk • Nuts • Oats • Oranges • Pork • Rice • Seeds • Wheat • Whole-grain cereals • Yeast • In industrialized countries, food made with white rice or white flour is often enriched with thiamine.

Iron:

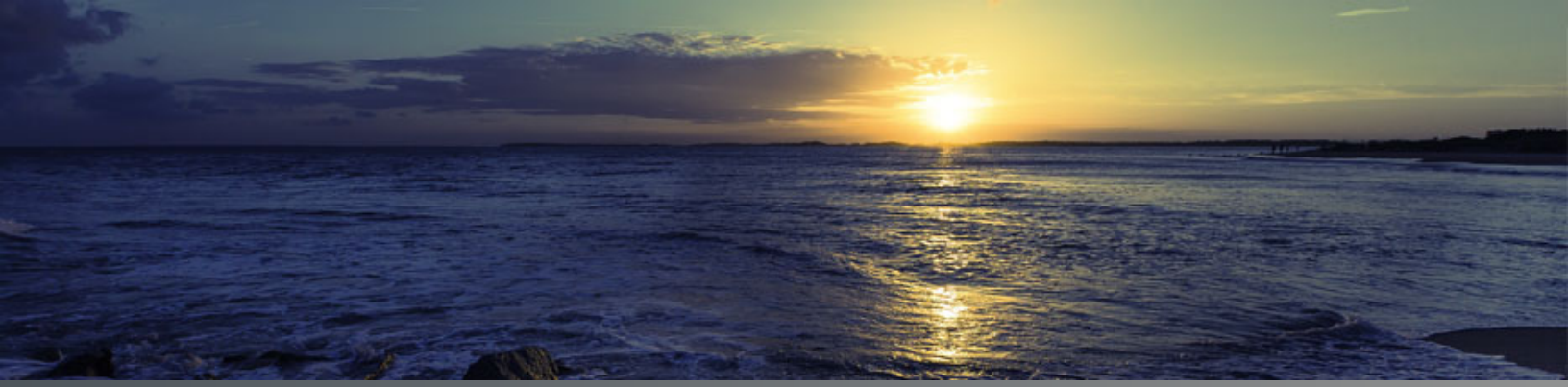
- Legumes • Lentils • Soy beans • Whole grains • Green leafy vegetables • Cereals • Bread • Spinach • Turnip • Fish • Eggs • Meat (especially high in red meats) • Sprouts • Broccoli • Dry fruits

CENTER FOR HUMAN POTENTIAL

APEIRON

Sleep Genotype Report

Client Name: Sample



CIRCADIAN PROPENSITY

GENETIC DATA

GENE	GENO TYPE
PER2(1)	n/a
PER2(2)	CC
PER3(1)	AG
PER3(2)	CC
AANAT	GG
CSNK1D	n/a
GNB3	CC
ARNTL	CC

MORNING

YOUR CHRONOTYPE

Humans are a diurnal species. We are active during the day and sleep at night. Many us feel more awake, alert and capable of our best work effort in the morning. However, there are those at the opposite end of the spectrum who prefer to stay up late and sleep well into the daytime hours. These individuals find themselves most alert in the evening.

The circadian rhythm is a cycle that signals our bodies when to sleep, rise and eat. Individual circadian variations are governed by the internal circadian clock network. This internal biological clock network resides in the brain and regulates the timing of functions such as appetite, hormone release, and metabolism. Our perception of this clock is the basic sleep-wake process.

Recent research has revealed that the circadian clock is not as basic as we once suspected. While we have tendencies toward a basic rhythm, what determines our desire to wake early or stay up late, is influenced by the same system that regulates the cycling of many bodily functions. Forcing the body to fit into a sleep-wake cycle that does not match our genetics, can lead to circadian dyssynchronization

INTERPRETATION:

You will likely feel best if you're going to bed early (9pm or so) and waking up early (6am or so).

RECOMMENDATIONS

Set an early bedtime and nightly routine to optimize your sleep and wakefulness patterns.
Create your lifestyle around your circadian propensities.

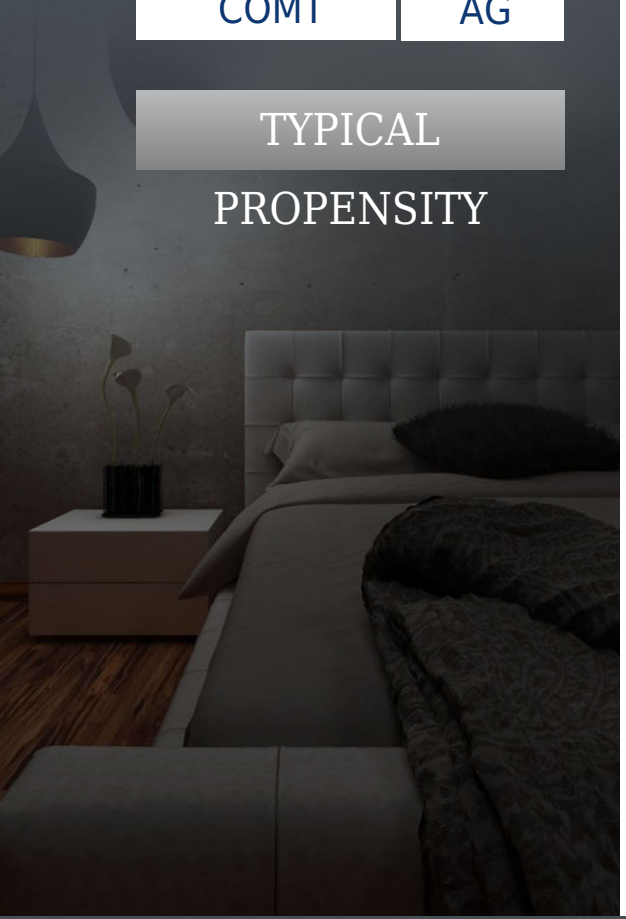
SLEEP ONSET

GENETIC DATA

GENE	GENO TYPE
NPSR1	AT
CLOCK(3)	AA
PER3(1)	AG
PER3(2)	CC
AANAT	GG
CACNA1C(1)	TT
CACNA1C(2)	AA
COMT	AG

TYPICAL

PROPENSITY



Normal sleep latency, the time from lying down to the first stages of sleep, is approximately 15-20 minutes. Falling asleep faster indicates a degree of sleep deprivation. Often, individuals with a genetic propensity for later sleep, try to force themselves into a different chronotype (circadian rhythm) which can result in significant sleep onset delays

Individual genetics play a large role in the prediction of longer or shorter periods of sleep onset. Despite possessing a propensity for delayed sleep onset, identifying the genetic components that are most impactful to the process allows a much more directed and personalized approach to optimal sleep interventions.

Normal time to onset of sleep is about 15-20 minutes. Onset of sleep outside of this range usually indicates either a genetic or lifestyle component

- 0-5 minutes = severe sleep deprivation
- 6-15 minutes = moderate sleep deprivation
- 15-20 minutes = normal
- >20 minutes = probable genetic or environmental

INTERPRETATION:

Typical means it should take you about 15-20 minutes to fall asleep. If this is inaccurate, consider looking at environmental or epigenetic factors.

RECOMMENDATIONS:

Be prepared to take 15 minutes falling asleep. If you'd like to shorten it, then have a nightly ritual to start the clock early. Maintaining healthy sleep habits is crucial to optimizing sleep.

SLEEP DURATION

GENETIC DATA

GENE	GENO TYPE
NPSR1	AT
CLOCK(1)	AA
CLOCK(2)	AA
PER2(1)	n/a
GNB3	CC
ADA	TC
ABCC9	TT
GRIA3(1)	CC
ABCC9	TT
CLOCK(4)	AG
DEC2	GG
COMT	AG

SHORTER

PROPENSITY

When we don't get the sleep we need, we experience surges of stress hormones which disrupt our cognition and ability to regulate emotions. 90% of adults require 7 - 9 hours of sleep a night.. Lost sleep reduces brain power and productivity, diminishes concentration and impairs memory. It lowers creativity, reduces the ability to communicate, impairs motor skills and increases stress and anxiety

Studies have demonstrated that just two hours of sleep deprivation (5 - 6 hours of sleep) results in a vigilance level equivalent to the consumption of two alcoholic drinks. Interestingly, while there is a detrimental decline in vigilance our perceived level of vigilance will be normal.

Many factors contribute to how long we sleep. Assessing your genetic sleep variations and establishing effective sleep strategies are essential steps in the process of sleep optimization.

Sleep requirements:
Teens 9-10 hours
Adults 7-9 hours

INTERPRETATION:

"Shorter" sleep duration in this context means closer to 7 hours than 9 hours.

RECOMMENDATIONS:

Take all sections and interpretations together to make the best plans for optimizing your sleep.

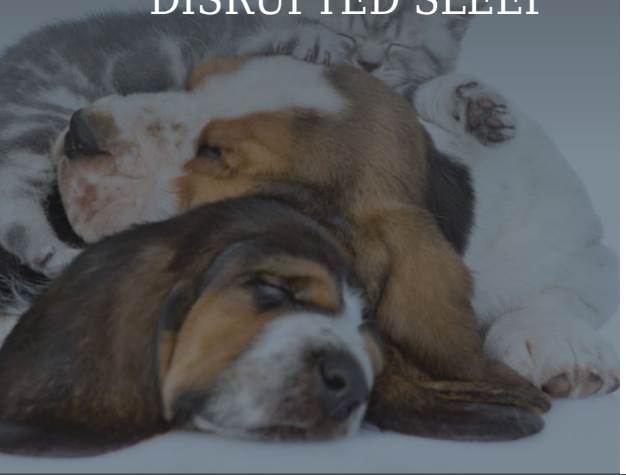
DISRUPTION OF SLEEP

GENETIC DATA

GENE	GENO TYPE
TNFa	GG
BDNF	CC
MTNRB	TC
PPP2R4	AG
ADORA2A	CT
GRIA3(1)	CC
COMT	AG
ARNT	GC
FABP7	CC
GNB3	CC

LOW

PROPENSITY FOR DISRUPTED SLEEP



Sleep Matters. It is the single most important thing you can do to improve performance in life. Sleep quality is determined by a complex network of interacting physiological processes which are strongly influenced by lifestyle. The quality of our sleep is influenced by the amount of deep sleep, the number and duration of waking episodes and the number of REM episodes. When our lifestyle is not in sync with our chronotype, sleep quality can be significantly impacted.

Genetic predispositions can evaluate variables such as melatonin production and response, excitatory versus inhibitory neurotransmitters and responses to our environment - light, caffeine, etc. Once a genetic variable is identified, a directed approach can be taken to improve the underlying issue. It is important to first get sleep patterns matching before addressing sleep quality.

INTERPRETATION

Unlikely to have fragmented or disrupted sleep.

RECOMMENDATIONS

If sleep disruptions occur, consider continued coaching to get an in-depth plan on how to optimize your sleep environment.

NARCOLEPSY RISK

GENETIC DATA

GENE	GENO TYPE
HLA-DRB1	GG
TRCA	TT
P2RY11	AG

TYPICAL

RISK

Narcolepsy is a long-term neurological disorder that involves a decreased ability to regulate sleep-wake cycles. It has been estimated that 1 in 2000 people are affected by narcolepsy.

There are two types of narcolepsy:

Type 1

Irrepressible need to sleep or daytime lapses into sleep occurring for ≥3 months.

Cataplexy (paralysis of motor control)

Cataplexy is absent

Spinal fluid hypocretin-1 concentration ≤110 pg/mL.

Type 2

Daily periods of irrepressible need to sleep occurring for ≥3 months

A mean sleep latency of ≤8 minutes and ≥2 sleep-onset REM periods.

Cataplexy is absent

Spinal fluid hypocretin-1 concentration >110 pg/mL

INTERPRETATION:

Low risk of daytime drowsiness.

RECOMMENDATIONS:

RESTLESS LEG

GENETIC DATA

GENE	GENO TYPE
MEIS1	TT
BTBD9(1)	TC
BTBD9(2)	AG
MAP2K5(1)	AG
MAP2K5(2)	AG
PTPRD	AG

TYPICAL

PROBABILITY

Excessive sleep movement is a condition that can disrupt not only your sleep but also the sleep of your bedmate. This is sometimes referred to as restless leg syndrome (RLS) and describes a condition that causes a strong urge to move one's legs. It is characterized by an overwhelming need to move the legs and symptoms tend to be worse at night. Spontaneous movements are triggered by rest, relaxation, or sleep.

Potential causes include iron deficiency, genetic predisposition, brain neurotransmitter imbalances and increased brain glutamate. There are no specific tests to confirm this condition.

Carrying genetic predispositions does not suggest that it is present, this is solely based on probability. There will be many people that have the symptoms without a genetic predisposition as well. The genetic variations can provide a guide to designing interventions that will have a higher probability of mitigating the symptoms.

INTERPRETATION:

Low risk of excessive movement during sleep.

RECOMMENDATIONS

RECOMMENDATIONS

Based on your genetics, you would benefit most by crafting your lifestyle around a morning propensity.

General Recommendations:
-Exercise earlier in the day will boost sleep.
-Only use your bedroom and bed for sleep and sex; your mind will associate your actions with your environment.
-Caffeine after 2pm destroys sleep quality
-Blue light from phones and computers disrupts melatonin production. Stop using them 2 hours before bed or consider blue-blocking glasses at night
-Create a nightly ritual before sleep to turn off your analytical mind
-Sleep in the cool (60-69 degress) and potentially naked.
-A cool shower 1 hours before bed or a warm shower closer to bedtime can help cool you down to help you fall asleep.
-Set a daily bedtime and wake-time.
-Create an ideal sleep environment; Very Dark, no LED lights, no phone lighting, no noise except potentially white noise from a fan, etc.

Supplementation:
-Vitamin B6
-Magnesium Glycinate
-Melatonin up to 3mg (start low, and increase dosage until you find the sweet spot). Extended release will probably have poor results for you. More on this in the hormones section.
-L-Theanine
-Apeiron's "Yawn Rejuvenating Sleep aid" contains melatonin, magnesium glycinate and L-theanine

Biometric Tracking:
-Sleep and/or Stress: Oura Ring or Biostrap
-Sleep, Stress, and Fitness: Garmin Fenix 5

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DETOX GENOMICS

Client: Sample

PHASE 1 DETOXIFICATION

GENETIC DATA

GENE	GENO TYPE
CYP1A1	AC
CYP1B1(1)	GG
CYP2A6(2)	AC
CYP2C9	CC
CYP2C19	AA
CYP2D6	CC
CYP2D6(3)	AG
CYP2D6(4)	AG
CYP2E1(1)	GG
CYP2E1(2)	TC
CYP3A4	TT

ESTROGENS

MEDICATIONS

ANESTHETICS

ACETAMINOPHEN

NSAIDS

Phase I detoxification is handled by a set of enzymes referred to as the Cytochrome P450's. There are around 18 different families of these enzymes and their production and function is controlled by over 50 genes. It is important to understand that despite the genetic controls, we do have the ability to alter the expressions of these genes in both positive and negative ways.

Cytochrome P450 enzymes are located predominantly in the liver but they are also found in other tissues such as the small intestine and even the brain. These enzymes are responsible for taking toxins through the first phase of detoxification. This first phase can convert toxins into benign forms but it also has the potential of creating an even more toxic product. Therefore, it is important to pay attention to both phase 1 and phase 2 detoxification pathways.

Toxins include; environmental toxins, medications, supplements, and even ones that are produced by our own metabolism and physiology.

INTERPRETATION:

NSAID, Medication, and Anesthetic metabolisms are great. Estrogen metabolism could use support and acetaminophen metabolism requires attention.

RECOMMENDATIONS:

DIM supplementation will support estrogen metabolism, D-glucarate can provide secondary support.
Acetaminophen: AVOID acetaminophen supplementation for headaches, etc. and AVOID alcohol intake.
If exposed to either, then cinnamon can help support system.

METHYLATION

GENETIC DATA

GENE	GENO TYPE
COMT	AG
MTHFR 677T	AA
MTHFR 1298C	TT
DHFR(1)	TT
DHFR(2)	ID
FOLR1	GG
SLC19A1	CT
CBS	GG

TYPICAL

GENETIC PROPENSITY

Methylation is one of the most important processes in the body and it plays a significant role in detoxification. In fact, methylation is involved in over 200 enzymatic reactions in the body and these reactions are occurring over a billion times per second within our cells.

Methylation is involved in a host of chronic disease situations including; heart disease, diabetes, cancer, multiple sclerosis, autism, and other neurologic conditions. Much of these risks are related to the role that methylation plays in detoxification.

There are also many cofactors that we should address when optimizing this system. B12, B6 and folate are all important to consider when deal with variants of genes involved in the methylation process. Supplementation is important but there are also lifestyle factors that will impact methylation including; not smoking, reduction of alcohol, exercise, and stress optimization.

Genetics can play a major role in the function of this system.

INTERPRETATION:

Typical risk for methylation propensities

RECOMMENDATIONS:

Consider Homocysteine Blood labs to ensure proper function.

ACETYLATION

GENETIC DATA

GENE	GENO TYPE
NAT1(1)	CC
NAT1(2)	GG
NAT2(1)	TC
NAT2(2)	GG
NAT2(3)	AG

TYPICAL

GENETIC PROPENSITY

Acetylation is one of the many major phase II detoxification pathways. The acetylation pathway involves adding acetyl molecules to toxins to facilitate elimination from the body. The two primary enzymes involved are N-acetyltransferase 1 and 2 (NAT1 and NAT2)

Most detoxification is performed in the liver but NAT is in many organ systems of the body including; intestinal tract, lungs, and kidneys where it makes up a line of defense against many environmental toxins, metabolic byproducts, and various prescription as well as nonprescription medications.

It works to help detoxify:

- Histamines
- Tobacco smoke
- Exhaust fumes
- Medications

Genetics variations play a role in the function of NAT and certain variations can classify individuals into slow, intermediate, or rapid metabolizers. Diminished function of these NAT enzymes can lead to organ toxicities and potential cancer risks.

INTERPRETATION

Low risk for unusual acetylation function.

RECOMMENDATIONS

GLUTATHIONE SYSTEM

GENETIC DATA

GENE	GENO TYPE
GPx1(1)	AG
GPx1(2)	CC
GPx1(3)	AA
GSTP1(1)	AA
GSTP1(2)	CC
GSTT1	TT
GSTM1(1)	CC
GSTM1(2)	AG
GCLC	TT
CAT	TC
CAT(2)	CC
TXN	AG

SUPPORT NEEDED

The glutathione system is the master regulator of detoxification and free radical manager of the human system. While many people focus on taking antioxidants and free radical scavenging supplements, this may not be the best option for optimizing the body. Focusing on the glutathione system will allow the body to manage these in a more efficient manner.

In addition to free radical scavenging, glutathione,

- Boosts immune function
- Enhances mitochondrial function
- Repairs DNA
- Detoxifies: Heavy metals, medications, environmental toxins, and pollutants

INTERPRETATIVE NOTES:

Support needed for all 3 detoxification systems: Glutathione, CAT and TXN.

INTERPRETATIVE NOTES:

Glutathione: NAC and selenium supplementation (refer to supplementation panel) boost this system
CAT: High fat diet, EGCG or NAC will boost this system
TXN: NR or selenium supplementation will boost this system.
My strongest recommendations are selenium and NAC

MITOCHONDRIA

GENETIC DATA

GENE	GENO TYPE
SOD2	GG
SOD(2)	AA
UCP2	CC
UCP4	CC
SIRT1	TT
SIRT5	TT
COX6B1	CC
ATP5C1(1)	GG
ATP5C1(2)	TT
NDUFS2	AA
NRF2(1)	GG
NRF2(2)	GG
NQO1	GG

SUPPORT BENEFIT

The mitochondria are classically viewed as the batteries of our cells. They produce the energy required for cell function, typically in the form of ATP. Mitochondria also have their own set of DNA and mitochondrial DNA is only passed to subsequent generations from the mother.

Many chronic health conditions are either directly or indirectly related to the function of our mitochondria and health experts have increasingly focused on maximizing mitochondrial health to optimize the human system.

Because of energy production, the mitochondria produce free radicals. Free radicals are thought of as damaging molecules. They can create oxidative stress which leads to chronic disease and poor health. This is not the whole truth, however, as some free radicals are essential and beneficial. Therefore, it is important to maintain balance and homeostasis in the body free radical system.

INTERPRETATION:

Mitochondria produce energy in your body. You have great mitochondrial genes, but could use a little extra support for optimal function.

INTERPRETATION:

Best support actions: Cold thermogenesis (cold showers/ice baths), exercise, high quality sleep, Intermittent Fasting
Supplemetation: NR, resveratrol, Omega-3, Nitric Oxide, D-Ribose, Berberine, MitoQ

MOLD SENSITIVITY

GENETIC DATA

GENE	GENO TYPE
HLA-DRA	GG
HLA-DRA(2)	GG
HLA-DRA(3)	CC

PROTECTIVE

GENETIC RISK

It is estimated that nearly 25% of the population carry genetics that predispose them to mold sensitivity. Persons carrying certain variants tend to not make the antibodies necessary to rid the body of the mold toxins. qhffs can lead to chronic inflammation and overall diminished health.

Mold is classified as a biotoxin and there are two factors that we need to consider when determining risk of chronic infection:

- Level and duration of exposure
- Genetics of the detoxification system

When it comes to mold, consider that according to the Environmental Protection Agency (EPA) Building Assessment Survey and Evaluation (BASE) study, 45% of U.S. buildings have current/ongoing water damage and 85% have past water damage. This is ripe breeding ground for toxic mold.

Symptoms can include:

- Chronic headache
- Fatigue/malaise
- Dizziness
- Memory problems/Brain fog
- Muscle aches
- Cough
- Shortness of breath

INTERPRETATION

While everyone experiences negative effects from mold exposure, you're more protected from the chronic or severe negative effects of mold exposure,

RECOMMENDATIONS:

Continue to avoid mold exposure.

LYME DISEASE

GENETIC DATA

GENE	GENO TYPE
TLR1	AC
ACSL1	AG
GAD1(1)	GG
GAD1(2)	TC
GAD1(3)	TG
PON1	n/a
GSTP1	CC
SOD2(2)	AA

INCREASED

GENETIC RISK

Lyme is a bacterial disease caused by a bacterium called Borrelia and is transmitted by ticks. Acute infection is well documented and early treatment is important. Chronic Lyme disease is a bit more complicated and can be difficult to diagnose due to a low incidence of detecting the infectious organism after initial treatment. Antibody titers are used but only confirm past infection.

The diagnosis of chronic Lyme disease is based primarily on symptoms. These symptoms can include;

- Chronic fatigue
- Headache
- Muscle and joint aches
- Memory loss /other cognitive impairments
- Numbness/tingling
- Gastrointestinal symptoms

Chronic Lyme disease is becoming a significant issue and several genetic variants have been identified that predispose individuals to more significant health issues. The genetic variants look at immune response as well as glutamate production since this is a significant contributor to the symptoms associated with chronic Lyme.

INTERPRETATION:

This is not risk of getting Lyme disease.
You have an increased risk of chronic or long-term negative symptoms from exposure to Lyme disease

RECOMMENDATIONS:

I strongly suggest avoiding exposure to Lyme disease. Deer ticks (which infect people with Lyme) are primarily found in New England and the Northwest United States.
If ever contracted, consider further coaching to mitigate negative effects.

ENVIROTOXINS & POLLUTION

GENETIC DATA

GENE	GENO TYPE
CAT(2)	CC
NQO1	GG
IL6	GG
UGT2B15	AC
LOX	CC

INCREASED SUPPORT NEED

Partial List of Toxins:
Agricultural chemicals
Organotoxins
BPA's
Phthalates
Airborne pollutants
Cigarette smoke

The consequences of living in an industrialized world is the exposure to new toxins that are created by society. Many of these "EPI-toxins" can significantly alter gene expression if they are not adequately detoxified by our body defense systems. These toxins can cause chronic disruptions of metabolic and endocrine processes and can even lead to disruptions of genetic expressions in our children and subsequent generations.

It is impossible to avoid exposure to these chemicals so it is essential to make sure that defense system is optimized to deal with the exposure. The CDC reported on over 300 chemicals that it monitors as part of its biomonitoring system that began back in 1999 and the list grows every year.

INTERPRETATION:

Increased susceptibility to synthetic chemicals, pollution, and envirotoxins found especially in beauty products and cleaning supplies.
Microplastics like phthalates found on receipt paper mimic estrogen and affect hormone levels throughout the body.

RECOMMENDATIONS:

Minimize exposure. Purchase cleaning supplies and beauty products that have adjectives like "fragrance-free" "paraben-free" "phthalate-free" "hypoallergenic" etc.
Supplementation: DIM, Matcha Green Tea, NR, Tulsi/Holy Basil, and Omega-3 all support the detoxification systems.

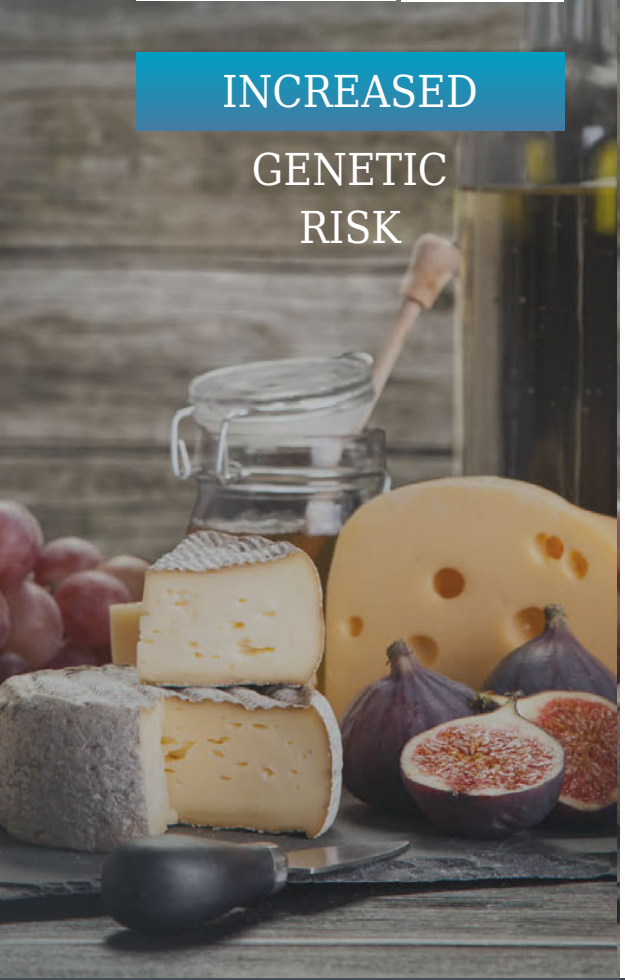
HISTAMINE SENSITIVITY

GENETIC DATA

GENE	GENO TYPE
AOC1(1)	TC
AOC1(2)	..
AOC1(3)	GC
HNMT	AA
HNMT(2)	n/a
MAO-B(2)	TT
MTHFR 677T	AA
MTHFR 1298C	TT

INCREASED

GENETIC RISK



Histamine release is a natural part of our defense system. It is responsible for sneezing, itching, hives, rashes, stuffy nose, etc. These all sound unpleasant but they have a purpose. This system, like every system in the body, requires balance or homeostasis. This means that it is good to have the response but we also need to be able to control it and turn it off when it is no longer needed or unnecessary.

Histamines can also come from our environment. Many foods contain histamines and even our own gut bacteria can produce histamines. Histamines are a sort of neurotransmitter that the body uses to signal that it is under attack so histamines, not produced by our own defense system, are obviously not a benefit.

This balancing system that is designed to turn off histamines can vary in each individual and much of this can be predicted by genetics. In this section, we look at genetic variants that can predispose to histamine intolerance.

INTERPRETATION:

Increased risk of histamine sensitivity. For you this means that some foods may trigger minor reactions.

RECOMMENDATIONS:

Extra Virgin Olive Oil, B12 supplementation, and adequate magnesium will help support the systems that eliminate histamines. The Apeiron Store also has a "Histamine Support Formula."

MERCURY

GENETIC DATA

GENE	GENO TYPE
GSTM1	AG
GSTT1	TT
GSTP1(1)	AA
GSTP1(2)	CC
MT4	AG
GCLM	AG
GPx1	AG
GPx1(2)	CC
GPx1(3)	AA
SEPP1	CC
ABCC2(1)	AG
ABCC2(2)	TC
ABCC2(3)	AG
ATP7B	CC
BDNF	CC

OVERALL PROCESSING

LOW

INORGANIC MERCURY

HIGH

ORGANIC MERCURY

VERY LOW

Mercury's effect on health is a hot topic in the wellness community that has prompted substantial debate. It is important to truly understand four specific aspects in order to make educated decisions on reducing and mitigating the risks. The four areas to consider are:

- Absorption
- Distribution
- Metabolism
- Excretion

There are two main forms of mercury; inorganic and organic. Inorganic mercury exposure comes from inhaled environmental pollutants, food, dental amalgams, vaccinations, and even supplements. Yes, supplements, especially Ayurvedic herbs as they have been found to have significant heavy metal contamination.

Organic mercury is the form that we are principally exposed to through fish consumption.

These two different types of mercury are processed by common detoxification systems and there are pathways that are specific for the type of mercury. We assess some of the common genetic variants that contribute to these processes and evaluate genetic variants that contribute to the processing and elimination of both types.

INTERPRETATION:

This section refers to your body's ability to eliminate mercury and other heavy metals from the body before they do damage.
While inorganic mercury detox is high, the general and organic processing is very low.
I suggest to keep your body at peak function. Chelation may be desired to eliminate any heavy metals that may have entered your bones.

MERCURY HEALTH IMPACT

GENETIC DATA

GENE	GENO TYPE
APOe(1)	TT
APOe(2)	CC
BDNF	CC
COMT	AG
CPOX4	TT
CPOX5	CC
PON1	TT
PGR	CC
TF	AA
MMP2	TC

OVERALL HEALTH IMPACT

MODERATE

Although all forms of mercury have adverse effects on human health at high doses, the evidence that exposure to very low levels of exposure may potentially lead to significant consequences for humans is still open to interpretation. Mercury's health effects impact each individual differently due to variations in the distribution, metabolism, and elimination of this highly reactive heavy metal. Mercury can affect many body systems including the brain & nervous system, heart, and kidneys. There are impacts on reproductive and endocrine function. It can induce or exacerbate autoimmune disease and neurologic risks in the perinatal and early childhood period can lead to cognitive and behavioral changes. Certain gene variants can predispose an individual to significant impact from even low levels of mercury exposure. Studies have demonstrated that this may be related to our genetics and we assess gene variants to get a picture of how mercury ingestion affects overall health.

RECOMMENDATIONS:

Thankfully, even though there's low processing of mercury and other heavy metals, the overall health impact is only moderate.

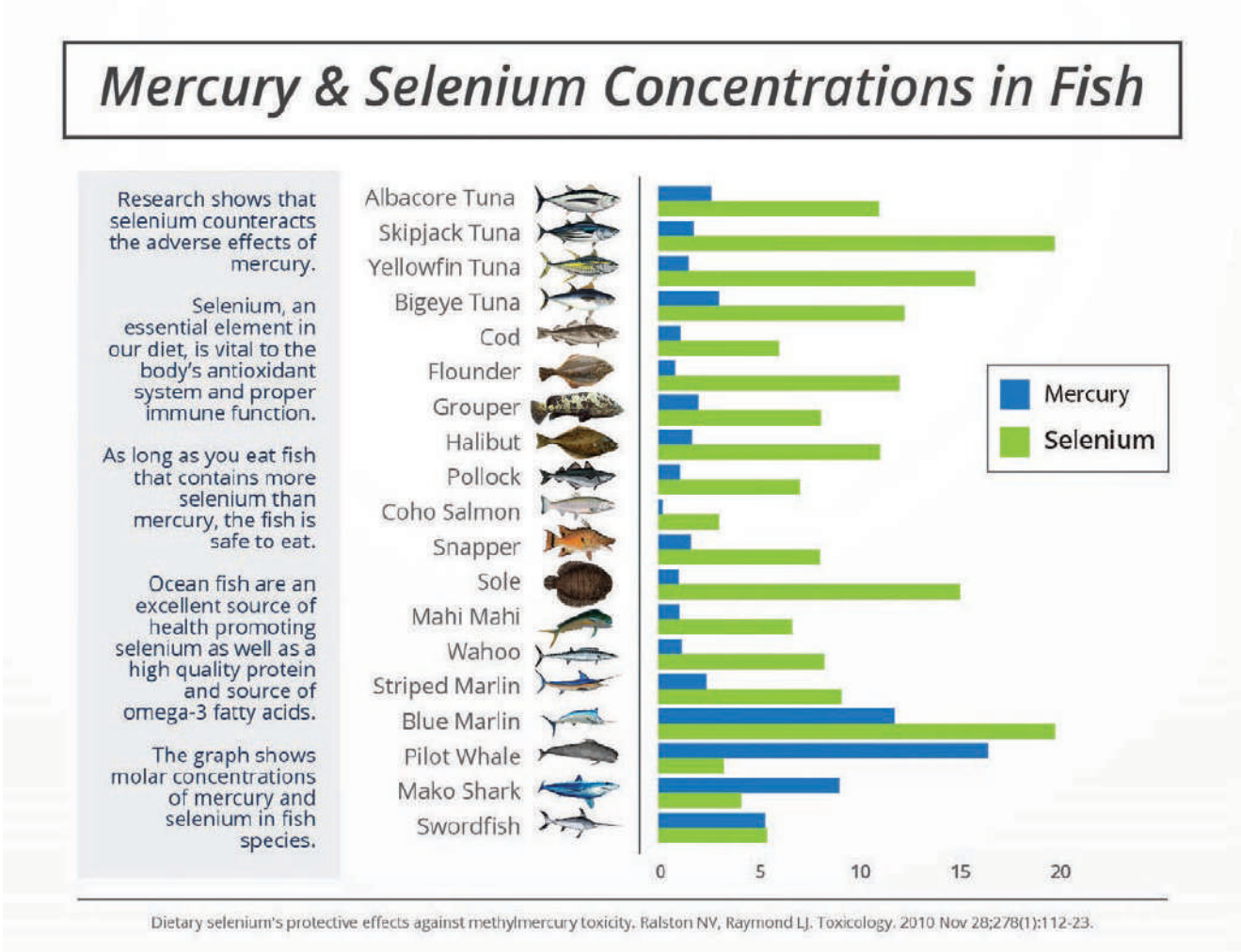
Supplementation: Adequate selenium, Berberine, holy basil, anti-inflammatory supplements such as turmeric/ curcumin, and mitochondrial boosters (mentioned earlier).

Ensure that fish in your diet have higher selenium than mercury in the chart below

For chelation, I recommend the Apeiron Store Chelation formula.

MERCURY AND FISH

Fish consumption is one of the more robustly discussed topics on the internet as well as in the scientific community as it represents the greatest source of exposure to organic mercury, referred to as methyl-mercury. This form of mercury in fish is about 95% absorbed and has a half-life in the body of approximately 70-80 days. This information by itself may prompt people to avoid fish yet it is only part of the story. The truth is that fish is very healthy in the diet, It is full of very healthy omega-3 fats and most fish contain a high molar ratio of selenium to mercury. This molar ratio is much more important than the absolute mercury content because selenium binds mercury and essentially makes it inert (nonreactive). In fact, recent evidence is suggesting that one of the major contributors of symptoms relating to mercury may actually be due to the mercury depleting our own body's stores of selenium and the amino acid selenocysteine. Consuming fish with a higher level of selenium than mercury is safe and healthy. Listed below are the average molar ratios for many of the common fish.



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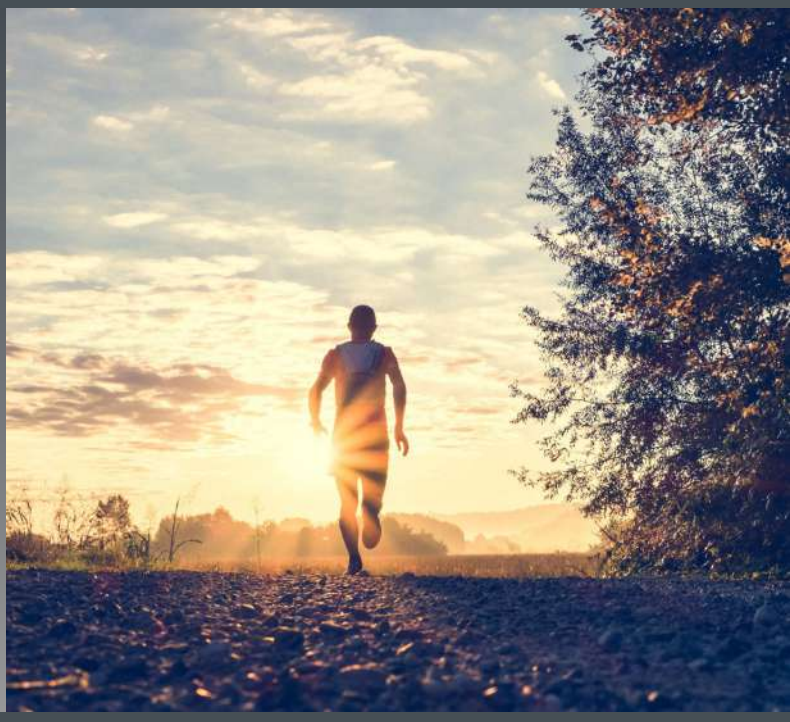
Athletic Performance Genomics

Client: Sample



About This Report

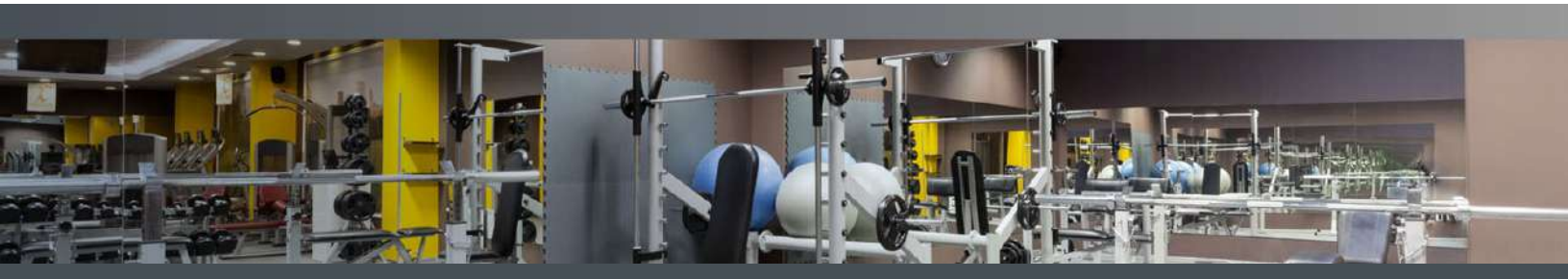
Strong evidence exists for the role that genetics play in athletic performance. Olympic and elite level athletes carry clear genetic markers that create a propensity for remarkable performance. It is important to point out however, that there are also many Olympic level and elite athletes that possess genetics that are not indicators of elite performance. This seemingly disparate occurrence can be attributed to several factors. First, athletic traits are generally expressed through a combination of genes as opposed to one specific variation in a single base pair out of 3 billion. Second, epigenetics provides the ability to alter the expressions of genes; we can upregulate or down-regulate expression through our environment and lifestyle.

The ACTN3 gene variant is one example; a certain variant of this gene will result reduced or no actinin-3 in muscle fibers. Elite sprinters mostly have the ACTN3 variant that codes for its presence in muscle. When it is missing, up-regulation is not possible, however, with appropriate training, even those missing the protein, can up-regulate production of a similar protein called actinin-2 through the gene ACTN2. Despite not having the gene for sprinting, there are still elite level sprinters and power athletes that have the variant without actinin-3.

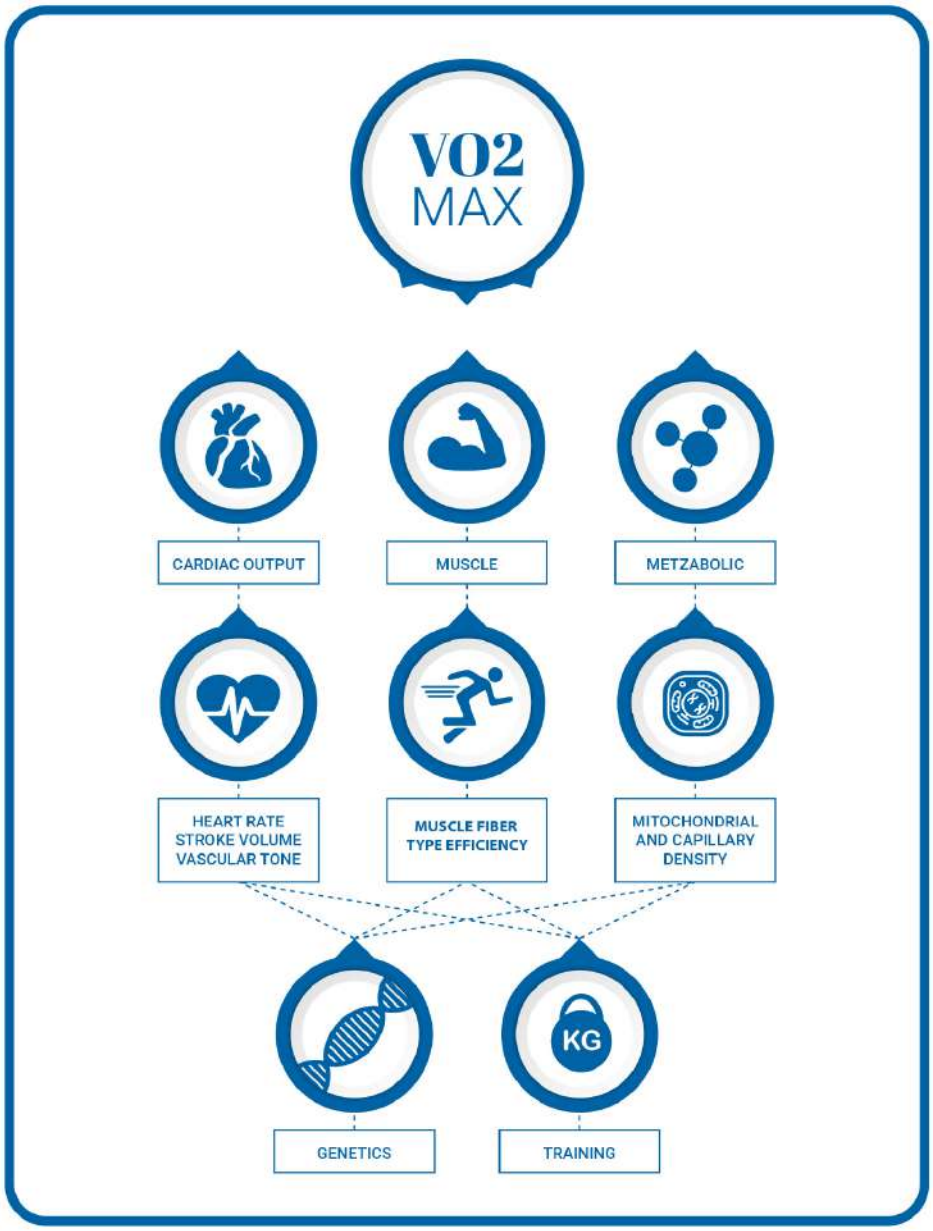
Finally, the alteration of specific genes also occurs when we take strategic action through the use of nutrigenomics (nutrition and supplementation).

Keep in mind that genetics is about propensities or probabilities, not absolutes. Having ideal genes for elite performance will not make you an elite athlete and not having optimal performance genetics does not make it out of reach.

This translation guide is not designed to provide direct to consumer guidance, but as a way to open a discussion with an Apeiron certified epigenetic human perfromance coach who understands the art and science of genetics, epigenetics, and the interactive component of using the personal genetic blueprint to guide success in alignment with your specific goals.



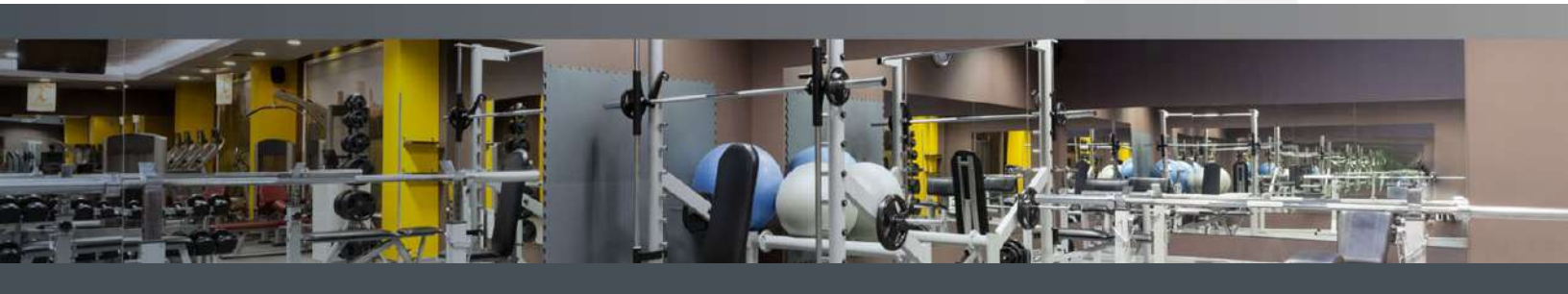
Understanding VO2 max



VO2 max = the maximum amount of oxygen a person can use during intense exercise.

Most genetic analysis is based on comparing athletes that have elite performance capabilities to non-elite athletes. These are mainly correlation studies and many of the gene variants that we consider are based on these correlations.

After looking at overall propensities for VO2 max, this report breaks down individual pieces of the system that contribute to VO2 max and the specific gene variants that contribute to the components. This helps to bio-individualize recommendations for improvement.



VO2 MAX OVERALL

GENETIC DATA

GENERAL

GENE	GENO TYPE
RGS18	GG
BTAF1	TT
TSHR	TT
GRIN3A	AG
KCNH8	TT
C9	GG
ZIC4	TT
CAMTA1	CC
BIRC7	AG
NDN	TC
TTC6	TG
APOE (1)	TT
APOE (2)	CC
HFE(1)	CC
HFE(2)	GG
PPARA	CG
VEGFa(1)	CG
HBB	TT
CHRM2	GG
EPAS1	GG

VO2 max is a common measure of athletic performance and can be used to guide training programs for optimal outcomes. Elite athletes consider optimal VO2 max an essential area to optimize. The is a strong genetic component to VO2 max that can predict 25-50% of the observed variability. This variability falls into multiple physiologic categories that comprise VO2 max.

VO2 max is the highest rate of oxygen consumption that an individual can obtain during maximal exertion. VO2 max is calculated by the Fick equation (cardiac output x arterial O2 – cardiac output x mixed venous O2). So, VO2 max takes into account the following physiologic parameters:

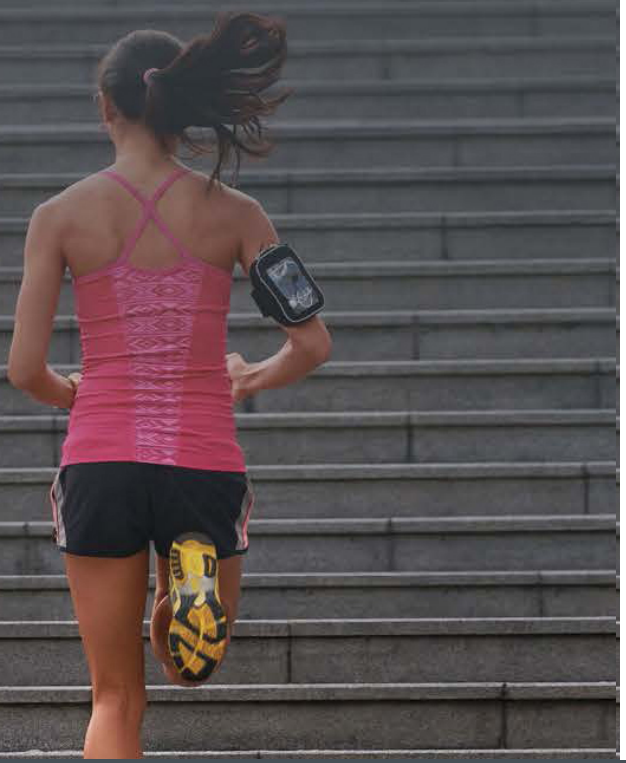
- Cardiac:
  - Stroke volume (contractility)
  - Heart rate
- Vascular tone
- Muscle fiber type
- Metabolic machinery of the cell

Overall VO2 Max Propensity

VO2 MAX CARDIOVASCULAR

CARDIOVASCULAR

GENE	GENO TYPE
ADRB1	CC
ADRB2(1)	AA
ADRB2(2)	CC
NFIA-AS2	GG
EDN1	TG
DBX1	TT
HIF1A	GG
CREB1	GG
KIF5B	CC
NPY	TT
BDKRB2	TC



One of the three main components of VO2 max is cardiovascular function . In this section, genes involved in creating optimized cardiac output are analyzed. These include genes that are involved in inotropic effect (modifying force or speed of contracting muscles) and chronotropic effect (changes in heart rate or rhythm). Additional aspects include genes involved in blood flow to the heart, the response to sympathetic nervous system stimulation, blood capillary density, and utilization & transport of oxygen to the cardiac mu s culature.
By identifying gene variants and their function, it may be possible to address specific interventions to optimize the cardiac aspect s of VO2 max.

INTERPRETATION

Relatively strong ability to use oxygen in the blood for the cardiovascular function.
Based on genotype correlation between Elite athletes and normal people.

RECOMMENDATIONS

VO2 MAX METABOLIC

METABOLIC

GENE	GENO TYPE
DEPTOR	AG
MIPEP	AA
ACSL1	AG
NRF1(1)	CC
NRF1(2)	AG
HIF1A	GG
PPARGC1A	CC
CKMM	TT
UCP3	GG
KIF5B	CC
AMPD1	GG
GABPB1	AA

MUSCLE

TTN	CC
DAAM1	TT
AMPD1	GG
AGTR2(2)	AA

Metabolic and muscular components of VO2 max are grouped together in this section because there is crossover in the genes involved with each.
VO2 max is t he body's ability to uptake oxygen, deliver it efficiently to the cells, transport it effectively into the muscle and then rely on the muscles metabolic machinery to use it in an optimized fashion.
Oxygen is a key component of the electron transport chain where macronutrients are converted into energy for contraction . Without ad e quate and efficient supply of oxygen, the conversion of nutrients into usable energy currency can be compromised.

Metabolic

Muscle

INTERPRETATION

Strong ability to use oxygen to power mitochondria and produce energy. Elite level genetics for muscle use of oxygen in the blood.

RECOMMENDATIONS

MUSCLE FATIGABILITY

GENETIC DATA

GENE	GENO TYPE
NAT2	AG
HNF4A	GG
AMPD1	GG
COL5A1(1)	CC
IL15Ra(1)	TT
AGTR2	CC
AGTR2(2)	AA
TTN	CC
ACE	TT

In athletic performance, an important parameter to consider is muscle fatigue. Muscle fatigue is defined as the decline in a muscles ability to generate force. Genetics play an important role in guiding optimized performance and certain forms of training can be implemented to enhance gene expression.

- Muscle fiber types
- Metabolic function
- Oxygen delivery
- Lactate clearance

Epigenetics - Adaptive training

Genetics provide probabilities or predispositions that can guide interventions and the epigenetics can be modified by specific training protocols or supplementation.

Fatigability

INTERPRETATION

Your muscles fatigue more slowly than usual. You have highly beneficial genotypes for recycling energy.

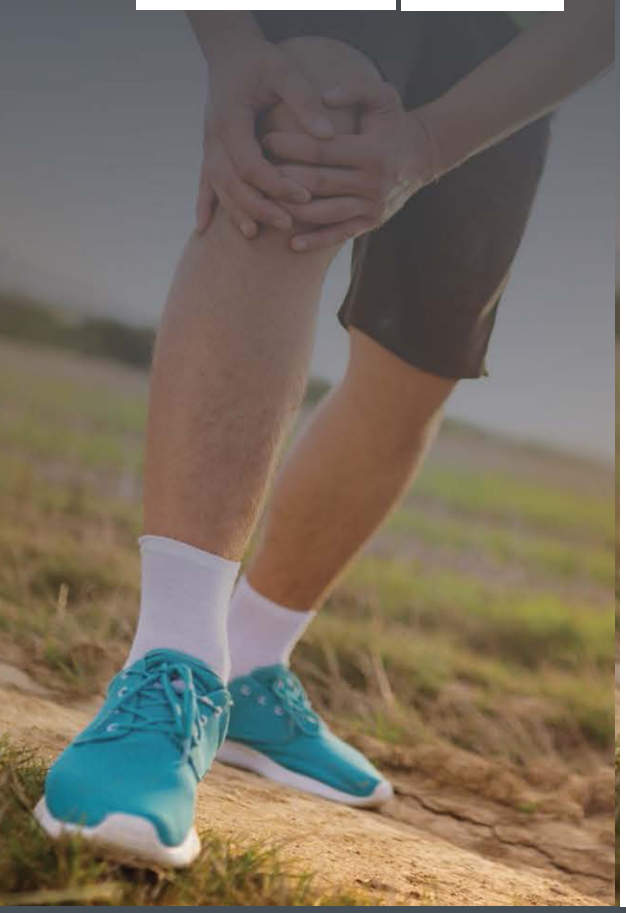
RECOMMENDATIONS

For further energy and mitochondrial boosts, consider cold showers/ice baths and supplementing: D-ribose, berberine, EGCG (green tea), Omega-3, resveratrol, NR, Nitric Oxide (beet root powder)

RECOVERY

GENETIC DATA

GENE	GENO TYPE
CRP(1)	CC
TNF	GG
SOD2	GG
IL1B	AA
IL6	GG
NAT2	AG
CKMM	TT
COL5A1(1)	CC
CHRM2	GG



Routine intense exercise is not a natural process, in fact, fitness training only became part of human life in the past century. To early hominoids, exercise was part of survival. Hunting required brief bursts of intense activity followed by long periods of rest, agriculturalists generally had prolonged low intensity without the bouts of intense exertion.

How much rest do we require between intense workouts?

The answer is not simple as the re is significant variability within populations and genetics play a key role. The body requires a certain amount of time to repair the damage incurred by intense workouts and understanding your genetic propensities can guide strategic planning to achieve the highest impact from your routine.

Probable beneficial rest interval after intense exertion:

INTERPRETATION

Increased recovery time means that you can take more time between workouts or sets to ensure that your muscles have enough time to recover.

RECOMMENDATIONS

Antioxidants may be desired to speed up muscle recovery, but not necessary. Take extra time between workouts and intervals. You would also benefit from ashwagandha supplementation post-workout.

STRENGTH/HYPERTROPHY

GENETIC DATA

GENE	GENO TYPE
ACTN3	TC
ACE del	AG
AGTR2	CC
AGTR2(2)	AA
SHBG	TC
MSTN	TT
RETN(1)	CC
IGFBP3	AG
IGF1	TT
CNTF	AG
DIO1	TC
IGF2(2)	CG
IGF2(3)	GG
IL6	GG
CCL2(1)	AA
CCL2(2)	AA
CCR2	TC
IL15Ra(1)	TT
IL15Ra(2)	TT
IL15Ra(3)	AA
ACVR1B	AG
RETN(2)	GG
IL6R	TC

Endomorph, mesomorph, or ectomorph; we are all aware that we possess certain genetic predispositions toward a specific body type. This genetic predisposition resides in the genetic variations that deal do with muscle strength and hypertrophy (muscle size).

It has been estimated across multiple genomic studies that >50% of muscle strength and muscle mass is attributable to heritable genetics.

We can investigate genetic variants that specifically code for hypertrophy and ones that code for strength development. There is no doubt that genetics will gift us with a specific proportion of muscle fiber types but through lifestyle approaches we have an ability to create different varying body type outcomes.

Strength

Hypertrophy

INTERPRETATION

Average ability to build strength and muscle size. More likely to focus on Endurance

RECOMMENDATIONS

Consider Holy basil supplementation and continued coaching for more detailed and bio-specific recommendations.

POWER/SPRINT

GENETIC DATA

POWER VS ENDURANCE

GENE	GENO TYPE
AGTR2	CC
AGTR2(2)	AA
ACE del	AG
ACTN3	TC
DMD	GG
AGT	GG
VDR	CC
TTN	CC
ACVR1B	AG
NAT2	AG
NOS3(3)	TC

An individual's ability to produce short burst explosive power can be strongly influenced by their genetic code. Looking at the genetics for muscle type, energy production, metabolic capacity, and neuromuscular response, can provide insight into your potential. Response to training is another important marker.

Knowing the code will also provide guidance for the techniques to improve response. Genetics will provide the clues to the hardware but the epigenetics provides us with the ability to modify expression.

Power/Sprint

INTERPRETATION

Strong propensity towards Power and sprint; fast-twitch muscles.

RECOMMENDATIONS

ENDURANCE

GENETIC DATA

ENDURANCE

GENE	GENO TYPE
AGTR2	CC
AGTR2(2)	AA
ACE del	AG
ACTN3	TC
BDKRB2	TC
GNB3	CC
ADRB2(1)	AA
ADRB2(2)	CC
ADRB2(3)	CC
PPARGC1A	CC
PPARD(1)	TT
PPARD(2)	AA
ADRA2A	GG
EPHX1	TC
LTBP4	GG
SCGB1A1	GG
UCP2	GG
VEGFA(1)	CG

E ndurance genetics take into consideration muscle type, metabolic capacity, efficiency of use of specific nutrients for fuel, energy turn-over, and cardiac response to all contribute to optimal performance. Knowing which areas are strong and which could benefit from training is important in planning training routines

Some athletes will be balanced in both power and endurance but elite athletes are usually shifted to one end of the spectrum

Endurance

INTERPRETATION

Despite "strong" propensity, my interpretation leans more towards elite level endurance genetics.

RECOMMENDATIONS

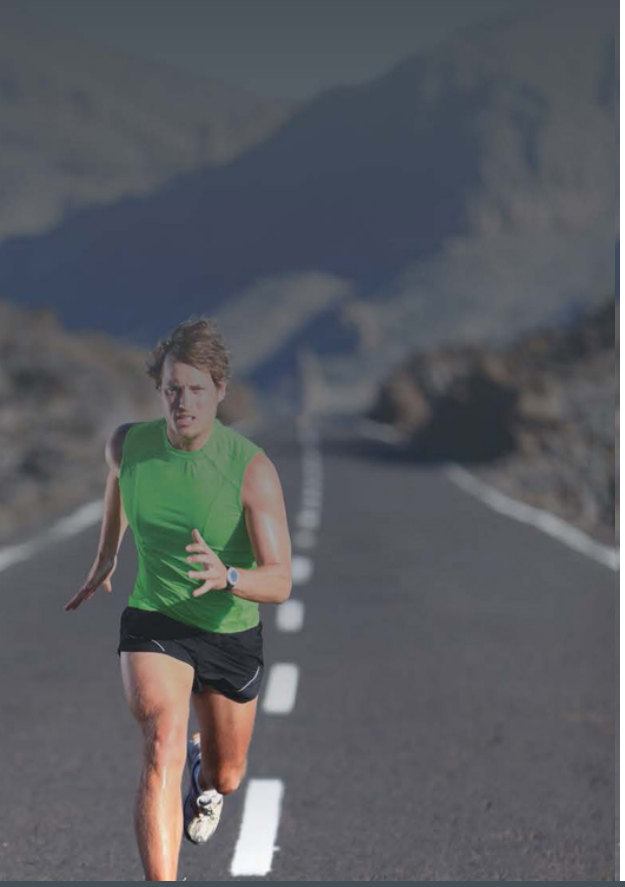
POWER VS. ENDURANCE

Genetic Propensity

Are you predisposed to better performance in sprint and power athletics or are you designed more for distance and endurance? Most people fall somewhere in the middle, referred to as a mixed athlete.

We look at wide ranging genetic factors that contribute to these various outcomes but possessing a specific predisposition does not relegate you to staying within that spectrum.

Knowing your genetics can guide your training to suggest a focus on enhancing your strengths or training less than optimal propensities.



INTERPRETATION

Despite "mixed" genetic propensity, My interpretation is that your strengths are more endurance-based than Power-based. Although you have beneficial genetics on both sides.

RECOMMENDATIONS

SOFT TISSUE

GENETIC DATA

GENE	GENO TYPE
COL1A1	CC
COL3A1	AG
COL12A1	AA
COL5A1 (1)	CC
COL5A1 (2)	CC
GDF5	AA
MMP3(1)	TC
MMP3(2)	TC
FAM46A	TT
CILP	AG
COL11A1	GG
CRP(2)	GG
CRP(1)	CC
IL-6	GG
ADAM12	TT
ESRRB1	TT
FGFR1	TC
SASH1	TC
SAP30BP	AG
COL6A4P1	CC
IL1RN	GG
IL1A	AA
CCDC111	CC
FGF10	CC
HIF1A(2)	GG
KDR(1)	TT
KDR(2)	GG

Genetic predispositions toward connective tissue injuries is an important consideration whether you are an athlete or a weekend warrior. These genes look at specific tissue types and based on population studies can provide valuable information regarding the potential for injuries. Knowing your genetic predispositions can guide risk mitigation.

Tendon and ligament injury risk

Cartilage risk

Lumbar disc injury risk

Rotator cuff injury risk

INTERPRETATION

Decreased risk of soft tissue injury.

RECOMMENDATIONS

Be mindful of lower back over time. Practice Yoga or other stretching, and consider using collagen protein or other interventions to maintain soft tissue health.

CENTER FOR HUMAN POTENTIAL

APEIRON

HORMONE REPORT

Client: Sample

THYROID

GENETIC DATA

GENE	GENO TYPE
PDE8B(1)	AG
PDE8B(2)	TC
PDE8B(3)	TT
PDE8B(4)	AG
THRA	TC
DIO1(1)	TC
DIO1(2)	AA
DIO2(1)	TC
DIO2(2)	TT
SLCO1B1	TT
SLC16A2	TT

AVERAGE

TSH PROPENSITY

LOW

D1 ACTIVITY

AVERAGE

D2 ACTIVITY

The thyroid gland is one of the most important endocrine organs in the body. It is responsible for production of hormones that control metabolism. The glands involvement in metabolism affects a range of body functions;

- Body weight
- Cognitive function
- Body temperature
- Menstrual cycles
- Muscle performance
- Cholesterol

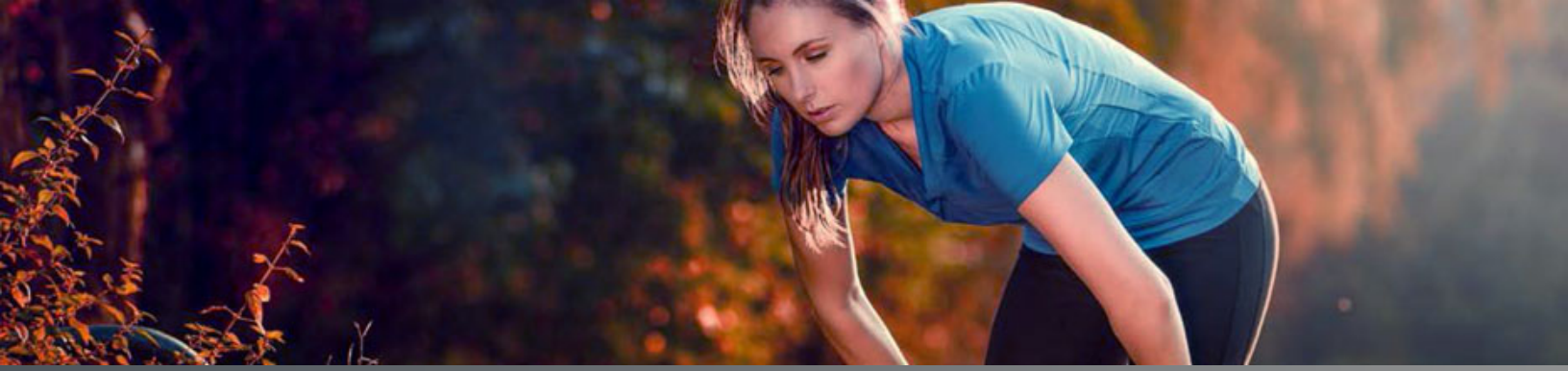
The production and utilization if thyroid hormone is highly complex and optimizing outcomes requires a deep knowledge of the interactions of lifestyle, environment, genetics, and epigenetics. Understanding the genetic polymorphisms involved can lead to much more precise interventions that can lead to optimizing the function to achieve greater potential. Genetic propensities can be used to better understand proper function of the gland, ranging from receptor sensitivity, conversions to active forms, brain responses, and supplements to improve function.

INTERPRETATION

Slightly above average TSH propensity. Low Thyroid Hormone production throughout the body, slightly below average production in the brain.

RECOMMENDATIONS

Consider testing Thyroid blood levels.



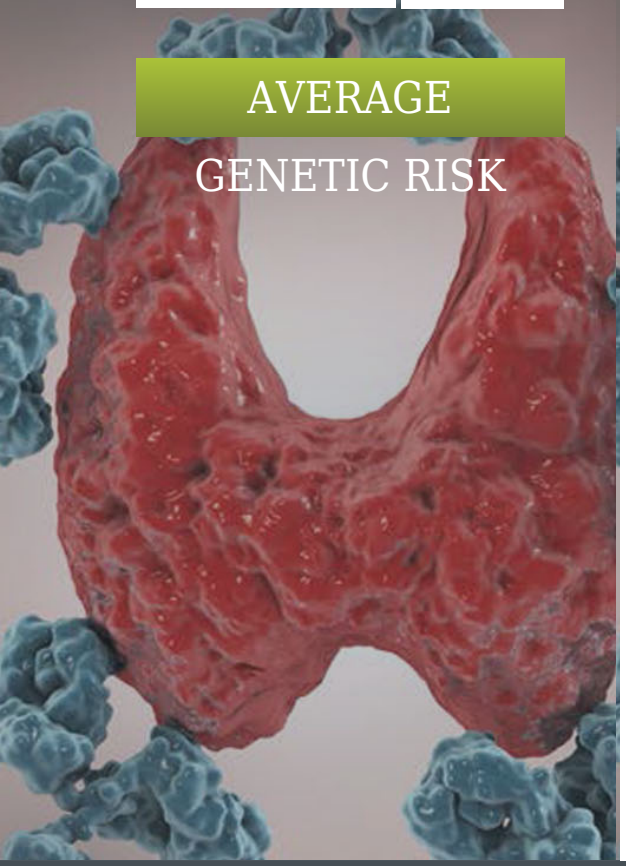
AUTOIMMUNE THYROID

GENETIC DATA

GENE	GENO TYPE
FOXE1(1)	GG
FOXE1(2)	GG
PTPN22	GG
DIO1(1)	TC
CTLA4(1)	AA
CTLA4(2)	AA
FCRL3	AA
IL23R	CC
TNFa	GG
IL6	GG

AVERAGE

GENETIC RISK



Autoimmune thyroid conditions are frequently over diagnosed. An underactive thyroid is not necessarily an autoimmune condition. Autoimmune hypothyroidism (or Hashimoto's thyroiditis) requires the presence of antibodies to certain cells in the thyroid gland and there is a genetic predisposition that people can carry. Autoimmune hyperthyroidism (or Graves' disease) is a condition where the autoimmune antibodies stimulate the receptor on the thyroid gland causing it to overproduce. The propensity for this condition is also passed along in our genes.

Symptoms of hyperthyroidism:

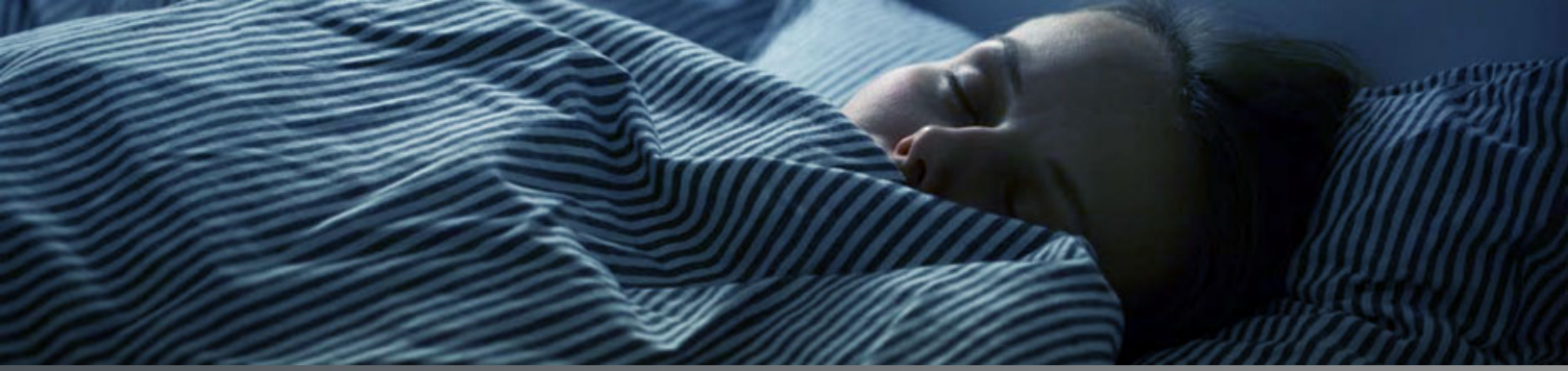
- Anxiety
- Insomnia
- Shaking hands
- Weight loss
- Sweating
- Hair loss

Symptoms of hypothyroidism:

- Weight gain
- Fatigue
- Dry skin
- Hair loss
- Cold hands/feet
- Constipation

RECOMMENDATIONS

Average (low) risk of autoimmune thyroid conditions



MELATONIN

GENETIC DATA

GENE	GENO TYPE
MTNR1B(1)	TT
MTNR1B(2)	GG
MTNR1B(4)	TC
TPH2(1)	GG
AANAT	GG
ADA	TC
CYP1A2	CC

DECREASED

PRODUCTION

LOW

RESPONSE

SLOW

BREAKDOWN

Melatonin is a hormone that is secreted predominantly by the pineal gland in the brain and is also produced in smaller amounts in other organs. Production drops off dramatically as we age and this can have significant health impacts.

Functions of melatonin:

Sleep - melatonin is intimately involved with regulation of our circadian rhythm

Antioxidant - a powerful free radical scavengerit interacts with immune cells to help boost response to infectious organisms

Immune function - it interacts with immune cells to help boost response to infectious organisms

Anti-aging - plays a suspected role in longevity

Melatonin can easily be supplemented in conditions where production or response is diminished. Genetic variants can help to guide the need for supplementation by looking at variants that are involved in production, receptor numbers, receptor responses, and breakdown to inactive form.

INTERPRETATION

Decreased melatonin production, likely low response to melatonin supplementation, and slow breakdown within the body

RECOMMENDATIONS

Be extra mindful to avoid blue light exposure at night. Consider blue-blocking glasses with computers. Consider melatonin supplementation starting at 1mg up to 3mg, never extended release. If it's not effective, consider combining Magnesium Glycinate, L-theanine, and possibly B6 to boost sleep.

CORTISOL

GENETIC DATA

GENE	GENO TYPE
FKBP5(1)	CC
FKBP5(2)	AA
FKBP5(3)	GG
COMT	AG
HTR2C	GG
GSTP1	AA
NR3C1	CC
CRHR1	AG
CRHR2(1)	AA
CRHR2(2)	AG

AVERAGE

PRODUCTION PROPENSITY

DECREASED

RESPONSE

Cortisol is frequently referred to as the "stress" hormone. The hormone itself is not the enemy and is essential to optimized human flourishing. Cortisol is essential to wake us up in the morning, it helps us to upregulate our physical response to acute stress while boosting performance in these situations, and very low cortisol levels impair decision making.

The brain is the ultimate controller for cortisol release, the adrenal gland is only the messenger and this is clearly demonstrated when we look at genetics. Studies are finding that most the genetic polymorphisms associated with cortisol levels are related to receptors that reside predominantly in the brain. These genetic variations are correlated with baseline and peak cortisol levels in the blood as well as rates of return to baseline levels. Many of these gene polymorphisms are highly vulnerable to life events that can epigenetically modify their expression. This can be good news in that it suggests that lifestyle factors may produce significant impacts on expressions despite carrying hard coded genetic predispositions.

INTERPRETATION

Slightly decreased production propensity, decreased response, leading to potentially longer production of cortisol

RECOMMENDATIONS

Practice stress-reducing techniques such as meditation, progressive muscle relaxation, biofeedback, etc. To manage stress and cortisol levels.

ESTROGEN

GENETIC DATA

GENE	GENO TYPE
ESR1(1)	AG
ESR1(2)	TC
CYP1A1	AC
CYP1B1	GG
CYP3A4	TT
COMT	AG
GSTP1	AA

AVERAGE

PRODUCTION PROPENSITY

CAUTION

METABOLISM

Estrogen is a beneficial hormone in both males and females. It has many benefits beyond involvement in reproduction.

In males and females, estrogen is essential to bone health. Some studies have suggested that it is as important as Vitamin D in maintaining or stimulating bone growth. Decreased estrogen levels have been correlated with decreased memory and cognitive function.

In females, it is important for maintaining the health of the sex organs, sex drive, and sexual function. In males, lack of estrogen, even with normal testosterone, there can be issues with sex drive and erectile dysfunction so balance is essential. In genetic predispositions, we can assess receptor response to estrogen and look at the breakdown of healthy versus unhealthy detoxification. By identifying the genetic variants involved in the breakdown of estrogens, supplementation interventions that modify, or shift, the metabolism to more optimal and healthy outcomes.

INTERPRETATION

Mentioned earlier in the Detox section. Production is normal, caution, provide support for metabolism

RECOMMENDATIONS

DIM and calcium d-glucarate supplementation to support estrogen metabolism.

TESTOSTERONE

GENETIC DATA

GENE	GENO TYPE
JMJD1C	CC
FAM9B	TT
SHBG(1)	CC
SHBG(4)	TC
SHBG(3)	AG
PLCH2	TC
REEP3	CC
LHCGR	TC
APOe(1)	TT
APOe(2)	CC
CYP19A1(1)	CC
CYP19A1(2)	GG
CYP17A1	AA
SRD5A1	AG
SRD5A2	CC
HDAC4	CC
HDAC9	TG
TARDBP	GG
FOXA2	TT
MAOA	CC
MAOB	TT

AVERAGE

SHBG LEVELS

DECREASED

LH LEVELS

Testosterone is traditionally classified as the primary sex hormone; the reality is that it is the primary sexhormone in both males and females. It is a hormone of vitality and maintaining healthy balanced levels is essential to optimized wellbeing.

Potential benefits:

- Improved wellbeing
- Improved confidence and drive
- Improved sex drive
- Improved bone density
- Improved strength & muscle
- Decreased cognitive decline
- Decreased body fat
- Improved mood

To fully understand testosterone availability and benefits in the body, it is important to look at several factors that contribute to the outcome. These include; the amount of binding from SHBG (sex hormone binding globulin), response to LH (luteinizing hormone), and conversion to DHT (dihydrotestosterone), and conversion to estrogen to name a few.

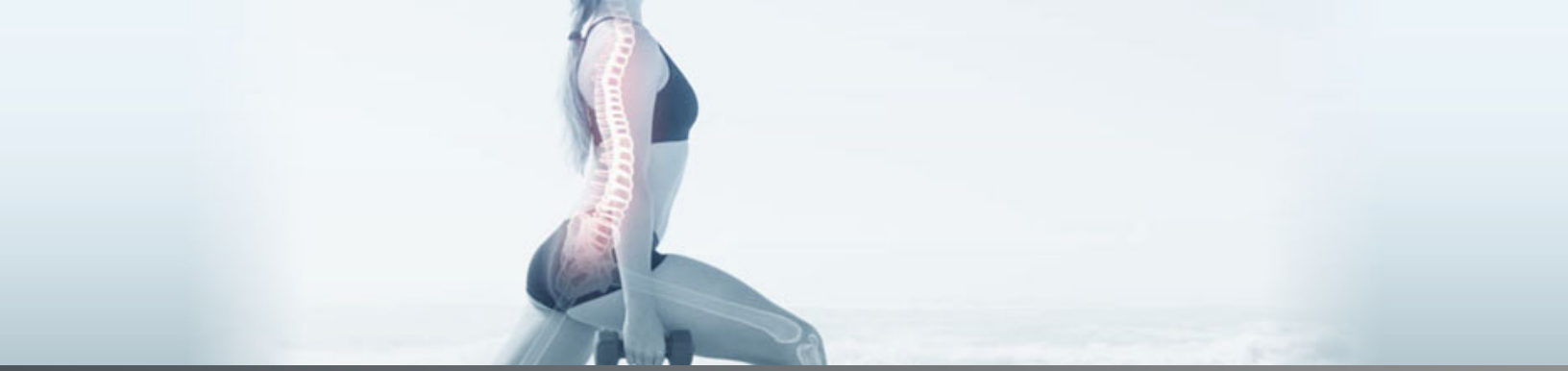
AVERAGE	INCREASED
DHT LEVELS	ESTROGEN CONVERSION

INTERPRETATION

Increased conversion on Testosterone to estrogen, decreased Lutenizing hormone (which stimulates production of testosterone.

RECOMMENDATIONS

Strongly consider testing testosterone and SHBG levels and do continued coaching for further assistance towards your goals.



BONE DENSITY

GENETIC DATA

GENE	GENO TYPE
CYP19A1(1)	AG
CYP19A1(3)	n/a
CYP19A1(4)	CC
CYP19A1(5)	TT
LRP5(2)	CC
LRP5(3)	TC
FAM3C	TT
ARHGEF3	AG
IL1B	AG
IL6	GG
TNFa	GG
VDR taq	AG
VDR fok	AA
VDR bsm	CC
APOe(1)	TT
APOe(2)	CC

INCREASED

GENETIC RISK

INCREASED

VITAMIN K NEED

Osteoporosis and osteopenia and terms used to describe degrees of low bone density. This process is usually silent and is frequently only discovered after a major bone fracture. Therefore, regular screening and optimization are so important. Consider the statistics;

- > 50% of 50-59yo females have low bone density
- > 30% of 50-59yo males

Decreased bone density is becoming more common in the younger population where screening is showing low levels in males and females in their 20's and late teens. Lifestyle, genetics, and hormones are major contributors.

- Smoking
- Medications: thyroid, reflux PPI's, and prednisone
- Lack of weight bearing
- Low vitamin D levels

INTERPRETATION

Increased risk of decreased bone density over time. Increased need for Vitamin D and Vitamin K to maintain healthy bones.

RECOMMENDATIONS

Regular Vitamin D3/K2 supplementation. Maintain healthy lifestyle that includes exercise.
Consider a quarterly DEXA or 3D body scan to measure and manage bone density over time and adjust.