MaxGen LABS

TheWorks Professional Series

Client Name:	Sample	Sample Received:	00/00/0000
Client DOB:	00/00/0000	Report Date:	00/00/0000
Vial Number:	MGP00000	MaxGen PTID#:	0000
Client Sex:	Male	CLIA Certification:	0000000000
Referring Account:	Sample		
Admin Notes:	Sample		
Lab Notes:	Sample		

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Basic Genetics & Information

Nutrigenomics: The study of how genetic expression is influenced by nutrition. Small variations in genetic structure may require specific nutritional support that is unique to each individual. Genetic testing provides insight to this need.

Genes: Transferred from parent to offspring, genes are the basic unit of heredity. Genes are found on chromosomes and are made up of DNA. Each person has two copies of a gene, one from each parent. Genes are named for the protein they create or the function they have, often being simplified into abbreviations (example: MTHFR – short for methylenetetrahydrofolate reductase).

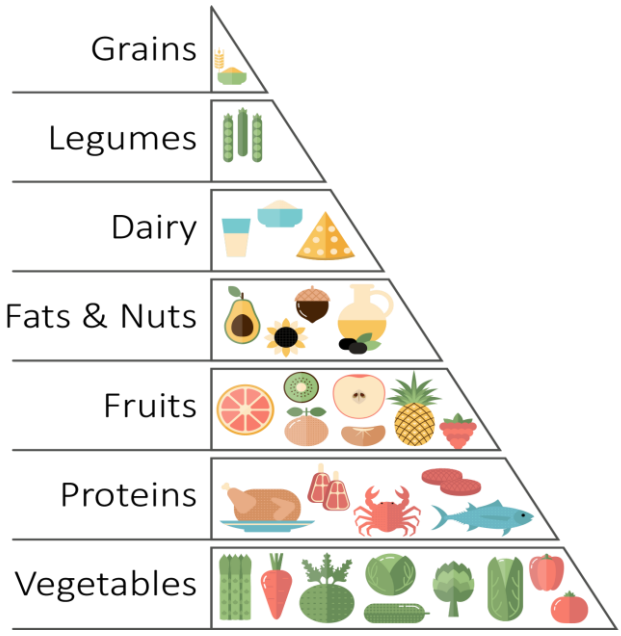
DNA: Deoxyribonucleic Acid, or DNA, is a molecule within a gene that contains the instructions an organism needs to grow, function, and reproduce. It is the carrier of all genetic information and is made up of chemical base pairs: adenine (A), thymine (T), cytosine (C), guanine (G). The order of sequence determines the information needed to maintain life.

Single Nucleotide Polymorphism (SNPs): A variation in base pair sequencing that may alter the function of a gene. Nutrigenomic testing looks at these variations to determine how a gene may function. Each combination of base pairs may alter the function of a gene in different ways. The variations are described as:

Wild Type – most commonly found pairing in nature; no variation
Heterozygous – one variant copy from a parent; one non-variant copy from a parent
Homozygous – two variant copies, one from each parent

Diet & Genetics

Your genes control how your body responds to fats and carbohydrates, your metabolism, your emotional response to food, and habits that control weight management. Each page of this report will contain information that can help you create a long-term eating plan, one that balances not only the types of food you consume but also when you eat and what you can do to supplement your diet. The information contained in this report should be used as an addition to a wellness plan for longevity and health.



The most well researched diet is the Mediterranean Diet. It is made of low-inflammatory foods that contain a wide variety of nutrients. It is full of vegetables, fruits, lean meats, and healthy fats.
The majority of people should consume a healthy amount of fats, specifically from sources like nuts, avocados, and olives. While most people will do well eating this way, certain genes suggest whether or not you can tolerate extra fats and carbohydrates. In this report, we will discuss
the variations of tolerance to fats and carbs and how the Mediterranean Diet can be altered to accommodate.

Genetics play a major role in the development of disease; however, dietary and lifestyle factors can greatly enhance or reduce your risk of chronic health conditions. Along with your susceptibility factors, we will discuss what you can do to reduce your chance of developing these chronic diseases. Specifically, this report will dive into the concerns of weight management, diabetes, autoimmunity, and cardiovascular disease.

Carbohydrates & Your Genetics

In addition to a standard Mediterranean Diet, there are several things that can be done to maintain a healthy weight and long-term wellness. Carbohydrates (sugars) are needed for energy production, and the source of those sugars is important. Carbohydrates come in the form of vegetables, fruit, legumes, and grains. When we talk about healthy carbohydrates, we mean this. They also come in the form of refined and processed sources. Pastas, cookies, cakes, and candies fall into this category. These are not considered healthy options. Refined carbs increase your chances of chronic disease.

Carbohydrate Sensitivity

Genes: FABP2

You are genetically sensitive to refined carbs. This means that these foods will increase inflammation. You should avoid highly refined carbs such as breads, pastas, and processed foods.

Weight Loss

Genes: PLIN

You show no potential benefit to a high carb diet for weight loss. Use a low carb, moderate protein diet for weight loss. Consider a Paleo diet. This gene determines the best diet for you if weight loss is a goal.

Diabetes & Blood Sugar

Genes: ADRA2, IRS1, PPARG, FTO

You have an average risk for diabetes and insulin resistance.

Fats & Your Genetics

Contrary to popular belief, fats are actually a necessary part of a healthy diet. Sources of good, healthy fats include eggs, fish, nuts, seeds, avocados, and olives. Your genes determine if you will have a sensitivity to the various kinds of fats. Some people have introduced a high fat, low carb diet (Ketogenic) into their lifestyle with remarkable success. Others have not. Below, we discuss the various types of fat and whether or not you can successfully incorporate them into your diet.

Monounsaturated Fat

These fats are considered to be heart healthy, lowering so called bad cholesterol and anti-inflammatory. Examples: Olive Oils, Nuts, Avocados

Genes: PPARG

You can consume monounsaturated fats; however, you would not benefit from consuming excessive amounts.

Polyunsaturated Fat

These fats are considered to be heart-healthy, but some are higher producers of inflammation. Healthy examples include:
Wild-caught Salmon & Sunflower Seeds

Genes: PPARG

You would benefit from the consumption of polyunsaturated fats. Choose healthy, organic options like fatty fish and seeds. Avoid refined vegetable oils like canola, soy, or safflower.

Saturated Fat

Given a bad reputation over the years, saturated fats are actually required for proper hormone production. Some people are genetically sensitive to them and should lower consumption. Examples: Animal Fats, Coconut Oil, Butter

Genes: FABP2

You are genetically sensitive to saturated fats. This means that they will increase inflammation. You should avoid them whenever possible.

Cholesterol & Your Genetics

Cholesterol is a necessary fat that is needed for proper brain and hormone health. While it is suggested that so-called bad cholesterol and triglycerides will lead to heart disease, it is important to keep dietary cholesterol in perspective. Eating fat according to your genes can help.

Genes: FADS2, LPL, KCTD10, LIPC

You have an increased risk of elevated LDL and Total Cholesterol levels
You do not have an increased risk of elevated triglyceride levels.
You have an increased risk of lower HDL levels. Consider increasing exercise.
Consumption of animal products could potentially lower your HDL. Consider a pescatarian diet for optimal health.

Ketogenic Diet Results

Genes: ADIPOQ, APOE

Based on current research, you can expect to have an average response from a ketogenic diet. Consider healthy fats, such as avocado, olive oil, nuts, seeds, and fatty fish.

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Gluten, Dairy & Your Genetics

The next piece of the puzzle when it comes to dietary needs is knowing whether or not you have a food intolerance. While you do not require a genetic mutation to acquire one, if you are genetically susceptible, you should be advised to avoid potential food triggers. In this test, we look at the two most common culprits of autoimmunity: gluten and lactose.

Dairy - Lactose

Lactose is a sugar found in dairy products. While many people are already aware of lactose intolerance but others may not notice any symptoms.

Genes: APOA2, MCM6

You are not genetically lactose intolerant.

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Gluten

Gluten is the protein found in wheat, barley, and rye. Known for its sticky nature, gluten can be added to foods unexpectedly. If you are gluten-intolerant, you must work diligently to avoid any hidden sources, such as soups, sauces, and lunch meats. A gluten intolerance is not synonymous with Celiac Disease; although, for the purposes of this test, we strongly encourage you to be tested if you have the genetic potential. Gluten intolerance and/or Celiac Disease can lead to a number of physical symptoms: GI dysfunction, skin conditions, mood disorders, hormone issues, and autoimmunity.

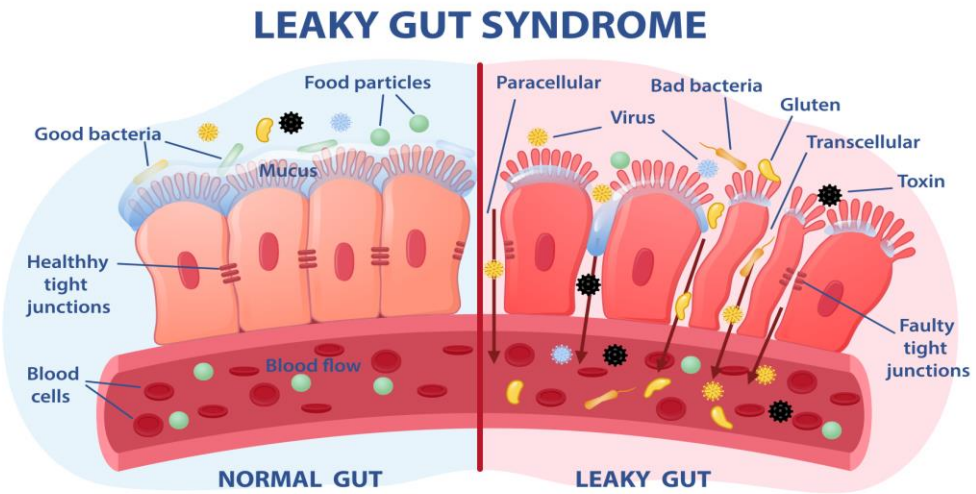
Genes: CCR3, HLA-DQ2.5, IL21, MYO9B

You tested positive for potential gluten intolerance. If you have symptoms, consult with a healthcare provider to consider further testing and possible interventions. You could also take the proactive approach and avoid gluten all together.

GI Disease Results

Genes: MYO9B

You may have an increased risk for developing autoimmune gastrointestinal diseases with the consumption of gluten.



Peanut Results

Genes: HLA-SNP

You have a slight increased risk for developing a peanut allergy.

Weight Loss, Eating Habits & Your Genetics

Your attitude around food can often determine your physical reaction to it. Whether you are an emotional eater, prefer snacking, or are more of a picky eater can all be seen in your genetic code. These small behaviors can have a drastic impact on your weight and well-being.

Energy Consumption

Genes: FTO

You are prone to eating more calories than needed for daily energy expenditure. Consult with a healthcare practitioner to discuss your resting metabolic rate.

Caloric Output

Genes: LEPR

You have a lower resting metabolism.

Exercise & Weightloss

Genes: FTO

You are less likely to lose weight in response to exercise. You still need to move on a regular basis. The MaxFitness Panel can help you determine proper exercise protocols for your genetic type.

Caloric Restriction

Genes: PLIN

You may be able to use calorie restriction for weight loss. Consider consuming 10% less calories than your resting metabolic rate. Work with a practitioner to determine the best calculation.

Emotional Eating

Genes: FTO

You are not genetically prone to emotional eating.

Intermittent Fasting

Genes: PLIN

You are prone to weight issues when eating late at night. You may do well with eating between the hours of 10am-6pm and fasting during the other hours of the day. Discuss this option with a healthcare practitioner.

Bitter Foods

Genes: TASR

You are able to taste bitter foods. This may make you less likely to eat green vegetables due to taste. Be sure to consume at least 9 servings per day.

Feeling Full

Genes: FTO

You are not genetically prone to low satiety.

Vitamins & Your Genetics

Your ability to metabolize vitamins plays a critical role in your health. While we like to think we can get all the vitamins we need from our food supply, due to modern agricultural practices this is becoming less likely. Vitamins are necessary for cellular health, which is the root of all bodily functions. If you want to avoid chronic lifestyle-related diseases, such as heart disease and diabetes, proper micronutrient levels must be monitored. If you have any potential for vitamin deficiencies, it is wise to consult with a practitioner about supplementation. Do not simply go to the health food store to buy generic multivitamins. Each genetic variant requires specific forms of micronutrients.

Vitamin E

This vitamin is a powerful antioxidant that protects cells from damage. Eating foods rich in vitamin E is recommended, including sunflower seeds, hazelnuts, and almonds. You could take a supplement for vitamin E, but most companies use soy or wheat germ as their source.

Genes: Intergenic- SNP

You may not have higher plasma levels of Vitamin E, which is a powerful antioxidant that protects cells from damage. Consider supplementation or eating more Vitamin E containing foods.

Vitamin C

This vitamin is critical for proper immune response. Deficiencies in vitamin C can lead to problems with connective tissues (such as bone, collagen, and muscles). Foods high in vitamin C are citrus fruits. Many opportunistic infections use vitamin C as a source of energy. This can lead to an increase in oxalic acid, which may cause significant symptoms.

Genes: SLC23A1

You are not genetically predisposed for Vitamin C deficiency.

B6 (Pyridoxine)

This vitamin is involved in several neurological functions, including the production of serotonin, noradrenaline, and protecting nerve cells. Foods that are rich in B6 include legumes, leafy green vegetables, eggs, and fish. You can also take a specific B6 supplement (use P-5-P).

Genes: NBPF3

You are genetically predisposed to Vitamin B6 deficiency. Consider supplementation and increasing foods that contain B6.

B2 (Riboflavin)

This vitamin is critical for nerve health, heart health, and healthy skin, hair, and nails. This vitamin works closely with all other B vitamins, helping to convert food sources into cellular energy (ATP). You could take riboflavin as a part of a healthy B complex.

Genes: MTHFR

You are not genetically predisposed to Vitamin B2 deficiency.

Vitamin D & Your Genetics

Vitamin D is a fat-soluble vitamin that must be converted in the liver and kidneys. Limited foods supply Vitamin D, so substantial exposure to sunlight or specific supplementation can be used when a deficiency is present. Vitamin D is crucial for calcium concentrations, bone growth, immune function, and the reduction of inflammation.

For daily use, both D2 and D3 forms of Vitamin D are beneficial, but D3 (cholecalciferol) should be used for therapeutic dosing during a deficiency. Supplements between 5,000 IU and 10,000 IU are ideal for daily therapeutic dosing. Daily intake should be between 1,000 – 2,000 IU of Vitamin D or cod liver oil for general wellness.Ideally, Vitamin D should be absorbed from natural sunlight exposure. Between the hours of 10am – 3pm, UV rays should hit the face, neck, arms, and shoulders for 10-30 minutes at least twice a week (avoid skin burns).

The three VDR SNPs in this test are from a physician poll of the most common SNPs needed in clinical practice. For blood work, practitioners tend to look at 25(OH) D by itself, while other practitioners also look at 1,25(OH)2D. The 1,25-dihydroxyvitamin D is formed from 25(OH)D in the kidneys under the influence of Parathyroid Hormone and specific enzymes; whereas, 25(OH)D is converted in the liver. It is also recommended to measure HbA1c for blood sugar control.

Vitamin D Foods

Cod Liver Oil
Swordfish
Salmon
Beef Liver
Egg Yolks
Cheese

Vitamin D Testing

1,25 OH Vitamin D may be helpful in some complicated cases. Your Doctor may order the following tests:
25-hydroxy (OH) vitamin D
1,25 dihydroxyvitamin D

Health Conditions

Rickets
Osteoporosis
Cancer
Inflammatory Bowel Disease
Multiple Sclerosis
Type I and II Diabetes

VDR-BSM

No variant detected for Vitamin D deficiency.

VDR-TAQ

No variant detected for Vitamin D deficiency.

VDR-FOK

No variant detected for Vitamin D deficiency.

B12 & Your Genetics

Do you get enough Cobalamin, or Vitamin B12? Do you take the right form of B12? Since your body does not produce B12, it is important to make sure you get adequate amounts of it in the correct form. B12 is important for a number of processes in the body, especially the production of neurotransmitters, energy, and blood cells. People often feel better switching to the correct form of B12 based on genetics and/or increasing their consumption. Consider micronutrient testing on a yearly basis. Always avoid cyanocobalamin.

B12 Blood Levels

Many genes are associated with decreased serum B12 levels. Increasing supplementation or using dermal or injectable B12 can help bypass a possible genetic issue.

Genes: FUT2, TCN

You have a risk for low serum Vitamin B12 levels. Use organic acid or homocysteine testing to verify your need for B12.

Methy-B12 Need

Produced by the enzyme MTRR, Methylcobalamin is the main form of B12 used for detoxification and neurotransmitter production. It is bio-active and can be found in good quality supplements.

Genes: MTRR

You have two heterozygous variations on the MTRR enzyme. This could create a need for B12 supplementation. Use organic acid or homocysteine testing to verify your need for B12.

Adenosyl-B12 Need

Adenosylcobalamin is mainly used to produce energy within the mitochondria. Many people report increased energy with Adeno-B12 supplementation.

Genes: MUT, MMAB

You have one of the three genetic markers that create the need for Adenosylcobalamin supplementation. Consider organic acid testing to verify your need for B12.

Methyl-B12-Sensitivity

Some people report sensitivities to methylated B12, including increased aggression and hyperactivity. We can occasionally predict these sensitivities by looking at other variations.

Genes: COMT, VDR

There are no genetic indications for Methylcobalamin sensitivity.

Low B12 Symptoms

Fatigue
Poor Balance
Memory loss
Neuropathy
Tingling feet
Depression
Anxiety
Pale Skin
Smooth Tongue
Constipation
Diarrhea
Heart Palpitations

Folate & Your Genetics

Folate, or B9, is a vitamin required for numerous processes in the body. DNA replication, neurotransmitter production and degradation, detoxification, and prevention of cardiovascular disease are just a few. It is found naturally in uncooked leafy green vegetables.

Folate - MTHFR

The MTHFR enzyme processes folates into methyl-folate, crucial for methylation, DNA synthesis, and numerous other processes in the body. Low levels of methylfolate have been associated with numerous symptoms and diseases. There are two main variants: C667T and A1298C.

Since MTHFR creates methylfolate, you can supplement with oral methylfolate. This can speed up the methylation cycle, returning detoxification and neurotransmitter production back to normal. This testing and approach has become common in fertility and psychiatric practices.

It is important to start slow and titrate up when using methyl folate. 400mcg is a common starting point for adults. Some research points to benefits from 400mcg to 15mg; however, many people do very well on doses under 2mg. Please see a practitioner for help with dosages.

MTHFR Symptoms

Depression
Anxiety
ADD/ADHD
Miscarriage
Cardiovascular Disease
Blood Clots
Bipolar
Schizophrenia
Cancer
Midline defects
And More

Your MTHFR Results

Genes: MTHFR

You have two copies of the A1298C MTHFR variation. This can result in a 40% decrease in conversion of dietary Folate into MethylFolate. Consider homocysteine or organic acid testing.

Avoiding synthetic folic acid and consuming a diet full of green leafy vegetables is important. MethylFolate supplementation may be appropriate if you have symptoms associated with Folate deficiency.

Methylfolate Sensitivity

Some people can be sensitive to methylfolate. In this case, different forms of vitamin B9 may be used. Consider folinic acid, and working with a practitioner.

Genes: COMT, VDR

There are no genetic indications for MethylFolate sensitivity.

Follow Up Testing

Genes: MTHFR, SLC19A1

You are genetically prone to Folate deficiency. Homocysteine, RBC Folate, and SAM/SAH ratio tests may be ordered by your doctor.

You have a heterozygous variation on one of the Folate receptor genes. This can lead to low levels of Folate inside the cell.

A RBC Folate test can verify your need for supplementation.

Vitamin A & Your Genetics Expanded

Vitamin A is essential for proper vision, growth, immune function, and gut health. There are two types of vitamin A: retinoids and carotenoids. Carotenoids are found in orange plants, such as carrots, and are precursors to retinoids (the bioavailable form). Retinol is the active form that is required for health.

Vitamin A - BCMO1

When most people think about increasing their vitamin A levels, they typically reach for a carrot or orange-colored vegetable. However, this is a carotenoid, not a retinoid or retinol. Our bodies have to convert carotenoids into retinoids by an enzyme called BCMO1. Some people have issues in BCMO1 that slow down their ability to form retinol from beta carotene. Your test checked for five different variations that might slow down retinal formation within your body. Consider working with a provider to monitor your blood retinol levels.

Low Vitamin A Symptoms

- Vision issues
- Infertility
- Mood disorders
- Skin problems
- Thyroid dysfunction
- Growth delays
- Infections

Dietary Sources Of Retinoids

- Free range eggs
- Organic heavy cream
- Shrimp
- Cod-liver oil
- Grass fed butter
- Grass fed beef liver
- Grass fed beef
- Wild caught fatty fish

High Vitamin A Symptoms

- Hair loss
- Liver damage
- Mental confusion

Your Results

Genes: BCMO1

You have one of the five markers associated with Vitamin A deficiency. Consider Retinol Palmitate supplementation.

Vitamin A Caution

Vitamin A is a fat soluble vitamin and there are studies that show excessive intake can lead to toxic levels. High levels of retinol might contribute to increased levels of heart disease and cancer. Please discuss supplementation with a trained provider and monitor blood retinol levels.

Inflammation & Your Genetics

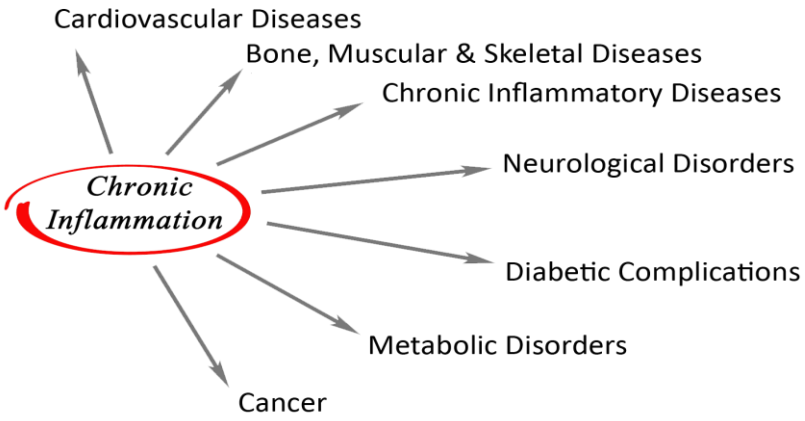
Inflammation is a natural part of our immune system that is used to protect us; however, it can become overactive. This increase in inflammation can cause many problems, such as cardiovascular, neurological, and autoimmune diseases. The Standard American Diet (SAD) is full of inflammatory foods and chemicals that add to this disease process. Your genes make you more susceptible to inflammation. Maintaining low levels of inflammation is the key to health.

Anti-Inflammatory Foods

- Blueberries
- Ginger/Turmeric
- Dark Chocolate
- Good fats
- Grass fed butter
- Free-range eggs
- Grass fed beef
- Wild caught fatty fish

Pro-Inflammatory Foods

- Sugar
- Vegetable oils
- Fried foods
- Wheat flour
- Dairy
- Bad fats
- Processed meats
- Conventional meats
- Fast foods
- Trans fat



Other Causes of Inflammation

- Lack of sleep
- Lack of exercise
- Lack of rest
- Over training
- Poor gut health
- Infection
- Toxic exposures
- Food Sensitivities

Labs Your Physician May Order

HS-CRP: High Sensitive C-Reactive Protein
ESR: Erythrocyte Sedimentation Rate
Omega 3/6 Ratios or Fatty Acid Tests
LPS: lipopolysaccharide

Generalized Inflammation

Genes: TNF

You are at a slight increased risk of inflammation. Fish oils, curcumin, and an anti-inflammatory diet should be considered. Pay close attention to gut health and any potential allergens or sensitivities.

Arachidonic Acid

Genes: FADS1

You are at risk for higher levels of the pro-inflammatory fatty acid, arachidonic acid. Consider Omega 3 supplementation and avoid high Omega 6 containing foods. Omega 3:6 ratio testing might be benefitial.

Detoxification & Your Genetics

Every day, we are exposed to hundreds of toxic chemicals in our environment. Our bodies also make toxic metabolic waste that has to be filtered hourly. Many of these pathways can be slowed down by different genetic variations. This section will break down some of your variations.

Insecticide Sensitivity

Organophosphate insecticides are one of the most toxic substances on the planet. They can cause diarrhea, PDD, autism, depression, aggression, and other emotional conditions. Children exposed to these have twice the risk of autism and PDD. Children tend to be more susceptible to insecticides.

Genes: PON1

You are not genetically sensitive to pesticides. They should still be avoided. Consume organic foods and use a water filter.

Acetaminophen

Due to the prevalence of acetaminophen use, knowing your genetic potential for toxic side effects is crucial. It has been associated with liver conditions, asthma, autism, GI issues, acidosis, blood cancers, and immune system depression. These are due to lowered glutathione levels.

Genes: CYP 2E1

You are not genetically predisposed for a toxic response to acetaminophen use. You should still consider natural alternatives, as it reduces Glutathione when used.

Glutathione

Glutathione is our master antioxidant and detoxifying molecule. Oxidative stress and toxic exposures can cause low levels of glutathione. Those with genetic predisposition to low levels may be more susceptible to the effects of environmental toxins.

Genes: GPX, GSTP1

You are genetically predisposed to reduced Glutathione production. Consider organic acid testing and supplementation.

Women's Health

In women, excessive levels of estrogen can lead to many conditions, including anxiety and even cancer. There are certain genetic situations that might limit someone's ability to remove estrogen from the body, which will increase estrogen levels.

Estrogen Levels

Genes: COMT & CYP1B1

You have one of the four genetic markers associated with conditions in estrogen metabolism. Monitor hormones with your doctor.

4-OH Estradiol

Genes: CYP 1B1

If you are female, you have a genetic variant associated with increased levels of 4-OH-Estradiol, which can be highly reactive. You should evaluate 4-OH-Estradiol levels yearly and seek appropriate medical intervention if needed.

APoE & Your Genetics

Apolipoprotein E (APOE) is a gene that codes for a transport lipoprotein that carries fats and cholesterol throughout the body. There are several E types, namely E2, E3, and E4. Both E1 and E5 exist; however, they are extremely rare. Most of the population carries the E3 status, and it is considered neutral for disease risk. Everyone has two E types (example: E2/E2, E3/E4, E4/E4, E3/E4 etc.), where one type is inherited from each parent. APOE status plays a role in cardiovascular disease and Alzheimer's risk. Exercise, especially lifting, climbing, and movement-based exercises are beneficial for all types.

E4 Risk Factors

Alzheimer's Disease
Faster progression of MS
Traumatic Brain Injury
Cardiovascular disease
Unable to detoxify heavy metals

E2 Risk Factors & Benefits

Hyperlipoproteinemia Type III
Elevated Triglycerides & LDL
Insulin & Glucose Concerns
Less risk for Alzheimer's
Vertebral Fractures
Neuro-protective
Vascular disease & Psoriasis

E4 Diet Recommendations

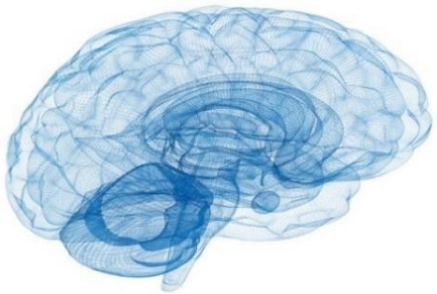
Intermittent Fasting
Mediterranean, low fat, or Paleo Diets
Avoid alcohol and saturated fat
Limit Seafood that is high in mercury
Limit cholesterol intake
Consider monitoring iodine levels
Consider regular sauna visits

E2 Diet Recommendations

Mediterranean Diet
Low Glycemic Diet
Intermittent Fasting
Avoid Refined Carbs
Paleo Diet
Low Fat

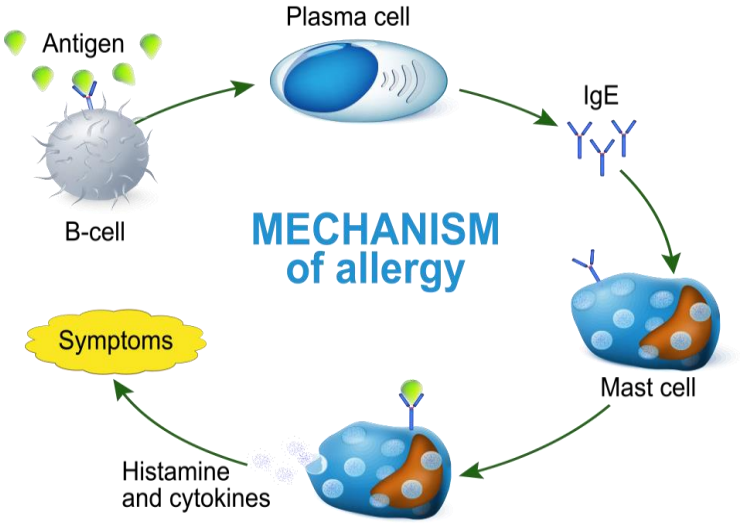
Your APOE Status

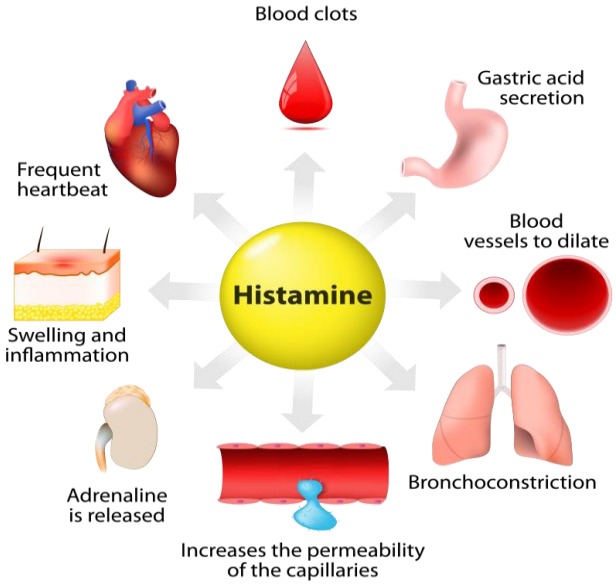
Your results: E3/E3 This combination is what is found most often in the general population.



Histamine & Your Genetics

Histamine is commonly known as an immune system chemical that is released during mast cell degranulation or when exposed to allergens. However, it is also a neurotransmitter in the brain and plays a role in digesting food in the stomach. In humans, histamine is broken down by two main pathways, Histamine N-Methyltransferase (HNMT) and Diamine Oxidase (DAO/AOC1). Excessive histamine can cause numerous issues in the body, and there are some genetic predispositions that enhance these issues.





High Histamine Foods

Alcohol/Ferments
Citrus Fruits
Dried Fruits
Soured Foods
Aged Cheese
Smoked Meats
Tomatoes
Walnuts
Cashews
Peanuts
Eggplant
Spinach
Shellfish
Bananas
Wheat
Strawberries
Beans
Chocolate
Food Dyes
Food Additives

High Histamine Symptoms

Headaches/Migraines
Nasal Congestion
Fatigue/Adrenal Fatigue
Irregular Menstrual Cycles
Eczema & Other Skin Conditions
Digestive Issues
Blood Pressure Issues
Anxiety

DAO (AOC1)

The DAO Enzymes is responsible for breaking down dietary histamine and histamine outside of your cells. It requires adequate levels of copper and can be inactivated by curcumin.

You have one heterozygous variant in the DAO(AOC1) gene. This may reduce DAO enzyme activity. Consider digestive enzymes.

HNMT

HNMT is responsible for breaking down histamine inside of your cells and is common in asthma. This enzyme requires adequate levels of SAMe from the methylation cycle.

No variant detected that increases cellular histamine.

MAO & Your Genetics

Monoamine oxidase (MAO) has two types, A and B, and plays a role in the oxidation of neurotransmitters. MAOA is chiefly responsible for the oxidation of serotonin and norepinephrine, while MAOB oxidizes phenylethylamine. Both oxidize dopamine. Each genetic variation of MAO creates different outcomes of the enzyme. MAO is also found on the X chromosome, so males who inherit the variation are technically hemizygous. Our algorithm, however, reports it as homozygous since we do not know the sex of each person performing this test. If your results suggest you have decreased MAO activity, it is suggested that you avoid cheese and other fermented/aged foods that are high in tyramine.

MAO-A (RS6323)	MAO-A (RS72554632)	MAO-B
You have a heterozygous variation. This, in some literature, is the desired combination. Normal activity MAO.	No variants detected. This should not cause symptoms.	No variants detected.

Fast MAO

A fast MAO enzyme will significantly decrease neurotransmitter levels and create symptoms of deficiency. Depression, anxiety, and low mood are commonsymptoms. Your practitioner may want to try nutraceuticals like St. Johns Wort, 5-HTP, tyrosine, resveratrol, B vitamins, sun and light exposure to help support a healthy mood.

Slow MAO

A slow MAO enzyme will allow for greater levels of neurotransmitters and cause symptoms of excess. Increased aggression and lack of empathy are common. In general, it is recommended to avoid caffeine, smoking, and stress when possible. Utilizing meditation, trying a low tyramine diet, and insuring proper B2, zinc, lithium orotate and hormone levels are all possible options to support a healthy mood.

Low Serotonin

Anxiety / Depression
Insomnia
Loss of pleasure
Paranoia, Inner rage
Weight Issues
Support:
5-HTP & St. John's Wort

Low Dopamine

Depression
Hopelessness
Lack of Motivation
Brain Fog/ Fatigue
Weight Issues
Low Libido
Support: Tyrosine, Bacopa

High Serotonin

Headaches
Diarrhea
Muscle Twitching
Confusion
Seizures
High Blood Pressure
Support: B2, B5

High Dopamine

Excessive Energy
ADD/ADHD
Anxiety
Agitation
Insomnia
Addiction
Support: B2, Methylation &Vit. C

Low Norepinephrine

Brain Fog, Depression
Low Blood Pressure
Adrenal Fatigue
Support: Vit. C, Copper Balancing, Tyrosine

Low PEA

Brain Fog, Depression
Difficulty Paying Attention
Incomplete Thoughts
Support: B6, DL-phenylalanine

High Norepinephrine

Anxiety, Sweating
Heart Palpitations
Constipation
Support: Methylation & B2

High PEA

Mind Racing
Insomnia, Anxiety
Schizophrenia
Support: Methylation & L-Threonine

COMT & Your Genetics

Catechol-O-methyltransferase (COMT) is a gene that creates an enzyme that breaks down dopamine, norepinephrine, epinephrine, and estrogen. These chemicals play a major role in mood, stress response, and productivity. Estrogen needs to be balanced and reduced appropriately to avoid issues. COMT does require the methylation cycle, with SAMe and magnesium being required in adequate amounts. It has been observed that individuals with slower COMT tend to be sensitive to methyl donors. In these cases, non-methylated vitamins like Folinic Acid and Hydroxocobalamin might be better options. People who are sensitive to these tend to have mood swings and anger issues. It has also been observed that carriers of the VDR-TAQ variation have additional risks.

COMT V158M	COMT H62H	VDR-TAQ
You have a heterozygous variation of COMT. According to some research, this is ideal.	You have a heterozygous variant. This may influence COMT activity.	Possible increased Dopamine sensitivity, which can worsen slow COMT and help fast COMT symptoms.

Fast COMT

Fast versions of the COMT enzyme are associated with decreased levels of neurotransmitters like dopamine. People with this have been shown to have higher pain thresholds, are capable of operating under adverse stress (The Warrior Gene), and have lower levels of anxiety.

Low Dopamine

Depression	Constipation	**Support**:
Lack of Motivation	GERD	Tyrosine
Fatigue	Muscle Cramps	Bacopa
Focus Issues		

Low Epinephrine

Depression	Migraines	**Support**:
Restless Leg	Sleep Disorders	Methionine
		Tyrosine

Low Norepinephrine

Focus Issues	Brain Fog	**Support**:
Low Blood Pressure	Depression	Tyrosine
		Vit. C
		Copper Balancing

Slow COMT

Slower versions of the COMT enzyme are associated with increased levels of neurotransmitters like dopamine. This has been shown to lower pain thresholds, increase a person's sensitivity to stress, and increase anxiety (The Worrier Gene). However, these individuals typically have an advantage at memory and attention based tasks.

High Dopamine

ADD/ADHD	Insomnia	**Support**:
Anxiety	Addiction	Riboflavin
Mania	Excessive Energy	Vit. C
		Methylation

High Epinephrine

Anxiety	Weight Loss	**Support**:
Sweating	Constipation	Adaptogens
Heart Palpitations		Phosphatidylserine

High Norepinephrine

Anxiety	Sweating	**Support:**
Heart Palpitations	Constipation	Methylation
		Riboflavin

Strength vs Endurance

The type of exercise that is best for you is largely dependent on gene expression. Certain genes determine muscle fiber types, which drive one to excel in long distance running or another in sprinting. Other genes determine whether you could become an elite endurance athlete. While research has been done on a variety of men (and few women), ones who are trained Olympians and others who are trying to get in shape, please keep in mind that you do have the ability to exercise and participate in sport regardless of genetic potential. Genetic testing does, however, help guide you on proper function for your body, and it allows you to modify your exercise routine to maximize gains.

Understanding the make up of your muscle fibers can help determine what form of exercise is best for you. Broadly put, muscle fibers are broken into two categories: fast twitch and slow twitch. While these categories can be further expanded, for the purposes of this report we will discuss the bigger picture. Fast twitch muscle fibers are important for short bursts, high energy, high strength actions. Exercises such as sprinting or heavy weight lifting require speed and brut force that are controlled by fast twitch fibers. On the other hand, slow twitch muscle fibers are important for endurance sports such as long distance running and swimming. They require greater amounts of oxygen and blood flow over longer periods of time. Most of the population has a mixture of these two fibers and could be served well by combining exercises; however, knowing your muscle fiber type can help you define the appropriate training both for pleasure or performance.

The gene ACTN3 is commonly known as the “gene for speed.” The wild type is found in a large population of elite athletes who focus on sprinting and fast action sports. Variants within this gene appear to reduce the fast twitch action of muscle fibers into a slow twitch action, creating an ideal setting for endurance sport. With the ADRB3 gene, one may have a greater chance of training to become an elite endurance athlete. The MSTN gene may play a role in whether one can perform instant muscle contractions that require peak muscle power (example: vertical box jumping) which would be required in HIIT training (High Intensity Interval Training).

Endurance Examples: long distance running, swimming, biking, dance, basketball, tennis, and soccer.
Strength Examples: low rep weight lifting, sprinting, sit ups, pull ups, climbing stairs, and box jumping.

Strength Vs Endurance

Genes: ACTN3

Your muscles are built for endurance training.

Elite Endurance Athlete

Genes: ADRB3

You have average endurance training abilities.

HIIT Training Safety

Genes: MSTN

You may have peak muscle power during instant movements. Consider adding strength training or HIIT exercises to your daily routine.

Aerobic Capacity

VO2Max is maximum oxygen uptake, which suggests how much oxygen is used by the body during intense, prolonged periods of exercise. It is a common measurement used during endurance training. People who have higher VO2Max can typically succeed at endurance sports. In the fitness world, the ability to maximize cardiorespiratory function can play a critical role in whether one becomes an endurance athlete. One gene appears to aid in the ability to train, while the other determines sustainability.

The PPARGC1A gene has been studied in European men, and research suggests that variants of this gene may allow for normal oxygen use while training. People who do not have a variant here may be at a disadvantage during training, as it lowers aerobic capacity.

The GABPB1 (NRF2) gene has been studied for its aerobic sustainability and antioxidant function. This gene appears to determine longevity in endurance sport once a person is already fully trained. Variants of this gene add greater aerobic capacity for endurance athletes.

VO2Max Potential

Genes: PPARGC1A

You appear to have lower VO2Max potential during training. This may impede your ability to train for endurance sports.

VO2Max Potential

Genes: GABPB1

You have greater potential for higher VO2Max once you are trained for endurance sports. This may help you sustain oxygen uptake during endurance sports.

Resistance Training

Resistance training is a type of exercise that applies a force against your movement. When your muscles are contracting against an external force, you may have a greater ability to build bulk within the muscle belly, increase bone strength, and increase endurance. Subcutaneous fat loss may occur more readily with resistance training as compared to other forms of exercise. Women respond exceptionally well to resistance training, especially as it pertains to bone health. Consider using resistance training as a part of any exercise routine for general wellness and longevity.

Fat Loss

Genes: INSIG2

You may be able to lose subcutaneous fat with resistance training.

Bone Strength

Genes: IL15

You have a greater chance of building bone strength with resistance training.

Muscle Gains

Genes: LEPR

You can expect to have average muscle gains from resistance training.

Weight Loss

Exercise plays a critical role in maintaining an ideal physique; however, losing weight and having the right fat to muscle ratio may not be dependent on exercise alone. Several genes determine how one will respond to exercise. This information can help you determine how much emphasis to place on exercise routines as it relates to weight and fat mass loss. If you are a person who is less likely to lose weight or fat mass in response to exercise, it is important to focus more on the quality of food you consume instead of spending hours in a gym. Early childhood intervention with exercise programs may help some Children but not others. It is important for all children to be physically active regardless of this genetic variant.

Weight Loss With Exercise

Genes: FTO

You are less likely to lose weight with exercise. You should still move, but consider low impact movements that are enjoyable.

Weight Gain With Inactivity

Genes: FTO

You have an average chance of obesity if you are inactive.

Early Childhood Intervention

Genes: INSIG2

Early childhood intervention may allow you to lose weight with exercise.

Cardiovascular Response to Exercise

There are variety of risks and benefits with any form of exercise. While every person needs to be physically active and get adequate amounts of exercise daily, some may need to know common risk factors that could occur with specific types of exercise routines. If you are an elite athlete or simply want to get fit, certain precautions should be taken into consideration. While these genetic factors are not diagnostic or absolutes, there are specific nutritional protocols that can reduce your risk of an incident while exercising. Please consult with a physician if any of these risks are of concern.

Insulin Response

Genes: LIPC

Exercising should make you more insulin sensitive. Consume branch chain amino acids and magnesium glycinate immediately following a workout. Monitor blood glucose, HbA1C, and HOMA-IR levels with your doctor.

Cholesterol Response

Genes: PPARD

You have an average chance of raising healthy HDL levels with exercise. Focus more on food choices discussed in the MaxFood panel.

Blood Pressure

Genes: EDN1

Exercise may help regulate your blood pressure. Consider hydroxocobalamin if Vitamin B12 is needed.

Genes: NOS3

You have an average risk of high blood pressure while exercising if you are unfit.

Cardiovascular Health

Genes: CCL1

You have an average risk of exercise induced ischemia.

Genes: LEPR

You have an increased risk of ischemic heart disease. Consider yearly cardiometabolic testing and micronutrient testing.

Genes: ADRB3

You have an average risk of exercise induced idiopathic venous thrombosis. Consider yearly cardiometabolic testing and micronutrient testing.

Muscle Metabolism

Muscle Cramping

Genes: COL5A1

You have an average risk of muscle cramping after exercising.

Muscle Weakness & Soreness

Genes: SLC30A8

You may have muscle soreness and strength loss after a workout. Consider using branch chain amino acids and magnesium glycinate immediately after a workout. Drink at least half your body weight in ounces of water daily.

Excessive Muscle Breakdown

Genes: ACTN3, SLC30A8

You may experience excessive muscle breakdown with intense exercise. This includes the possibility of increased creatine kinase and myoglobin levels post exercise.

Muscle Stiffness

Genes: ACTN3

You have a low chance of having stiff muscles. Warming up and stretching is still advisable.

Twitch Fibers

Genes: ACTN3, PPARGC1A, FTO

You have a very high probability of having predominantly slow twitch fibers. This is great for endurance sports.

Muscle Strength

Genes: MSTN, ACTN3, ADRB2

You can expect to have average peak muscle strength.

Tendon, Joint & Bone Issues

MoInjuries to muscles, tendons, ligaments, and joints are common during exercise. Your genetics simply describe your propensity for these specific concerns, but injury can be exacerbated by a number of factors. To reduce your chances of injury, drink plenty of water, use proper form, and warm up appropriately. If you are already injured, consider changing your exercise routine so that you will not produce further damage.

Rotator Cuff Injury

MMP3

People with your genotype have shown to have a normal risk of rotator cuff injuries. Rotator cuff exercises are still recommended to prevent injury.

Tennis Elbow

Genes: COL5A1

People with your genotype have shown to have average risk of tennis elbow. Stretching and forearm strengthening exercises should still be considered.

Ankle Injury

Genes: NFIB, ACTN3

People with your genotype have shown to have increased risk of ankle injuries. Ankle strengthening exercises should be included in your exercise programs. Please discuss further with a qualified athletic trainer.

Meniscus Injury

Genes: GDF5

People with your genotype have shown to have a normal risk of meniscus injury.

ACL Injury

Genes: COL5A1

People with your genotype have shown to have a normal risk of ACL injury

Achilles Tendinopathy

Genes: MMP3

You are not at a greater risk for developing Achilles tendinopathy.

Hip Fracture

Genes: GC, FTO

People with your genotype have shown to have increased risk of hip fractures later in life. You should monitor your vitamin D levels and bone density with your physician.

Knee Osteoarthritis

Genes: COL5A1

You have a moderate increased risk for knee osteoarthritis. Consider adding resistance training as a daily routine. You can also consider using collagen peptides.

Osteoarthritis

Genes: MMP3

You have an average risk of osteoarthritis as a response to exercise.

Additional Information

Altitude Performance

Genes:EDN1, ARDB2, ACTN3

You have a decreased risk for acute mountain sickness and can expect faster altitude acclimatization.

Testosterone

Genes: ACTN3

People with similar genetics are prone to having lower testosterone levels when compared to others.

Sleep Duration

Genes: LEP

You may not sleep as long as others. If you have trouble sleeping, please discuss with a qualified professional.

Sleep Apnea

Genes: PPARG

You can expect to have a normal risk of sleep apnea

Sleep Dyspnea

Genes: ADRB2

People with similar genetics have shown to have an increased risk of sleep dyspnea.

Sport Specific

Combat Sports	• People with similar genetics are less likely to be a combat sports athlete
Soccer	• You have a normal likelihood of becoming an elite soccer performance
Gymnastics	• You have a higher likelihood of becoming a gymnast.
Elite Swimming	• You have an increased likelihood of becoming an elite swimmer.
Swimming	• You have an increased likelihood of being a distance swimmer.

Your Genetic Summary

B12 Levels	• You have a risk for low serum Vitamin B12 levels. Use organic acid or homocysteine testing to verify your need for B12.
Methyl-B12	• You have two heterozygous variations on the MTRR enzyme. This could create a need for B12 supplementation. Use organic acid or homocysteine testing to verify your need for B12.
B12 Sensitivity	• There are no genetic indications for Methylcobalamin sensitivity.
Adeno-B12	• You have one of the three genetic markers that create the need for Adenosylcobalamin supplementation. Consider organic acid testing to verify your need for B12.
Vitamin A	• You have one of the five markers associated with Vitamin A deficiency. Consider Retinol Palmitate supplementation.
Vitamin D	• There are no indications of genetic Vitamin D metabolism issues.
Folate/MTHFR	• You have two copies of the A1298C MTHFR variation. This can result in a 40% decrease in conversion of dietary Folate into MethylFolate. Consider homocysteine or organic acid testing.
Folate Sensitivity	• There are no genetic indications for MethylFolate sensitivity.
Dietary Histamine	• You have one heterozygous variant in the DAO(AOC1) gene. This may have little impact on the DAO enzyme activity.
Cellular Histamine	• No variant detected that increases cellular histamine.
DHA Fish Oil	• You are not genetically predisposed to a deficiency in Omega 3 Fatty Acids. Regular intake of fish or omega-3 oils should be consumed.
Phos-Choline	• You are not genetically predisposed to Phosphatidylcholine deficiency.
Arachidonic Acid	• You are at risk for higher levels of the pro-inflammatory fatty acid, arachidonic acid. Consider Omega 3 supplementation and avoid high Omega 6 containing foods. Omega 3:6 ratio testing might be benefitial.
Inflammation	• You are at a slight increased risk of inflammation. Fish oils, curcumin, and an anti-inflammatory diet should be considered. Pay close attention to gut health and any potential allergens or sensitivities.
Estrogen levels	• You have one of the four genetic markers associated with conditions in estrogen metabolism. Monitor hormones with your doctor.
Bad Estrogen	• If you are female, you have a genetic variant associated with increased levels of 4-OH-Estradiol, which can be highly reactive. You should evaluate 4-OH-Estradiol levels yearly and seek appropriate medical intervention if needed.
Pesticides	• You are not genetically sensitive to pesticides. They should still be avoided. Consume organic foods and use a water filter.
Glutathione	• You are genetically predisposed to reduced Glutathione production. Consider organic acid testing and supplementation.
Probiotic	• There are no probiotic recommendations based on some of your results. See the box below if there are additional recommendations.
Secretor Status	• FUT2 Secretor. There are no probiotic recommendations associated with this variant.

MaxFunction SNP Report

Gene	RS#	Result	Client	Minor	Short Description
AHCY-01	rs819147	-- Wild Type	TT	C - 31%	No genetic cause for low homocysteine or glutathione.
APOE	rs429358	-- Wild Type	TT	C - 15%	See APOE page for details. If rs 7412 is T =E2 If rs7412 is C = E3 (normal)
APOE	rs7412	-- Wild Type	CC	T - 8%	See APOE page for details. If rs429358 is C = E4 If rs 429358 is T = E3 (Normal)
BCMO1	rs11645428	-- Wild Type	GG	A - 15%	Genetic cause for Vitamin A deficiency. See Vitamin A page for details.
BCMO1	rs12934922	-- Wild Type	AA	T - 22%	No genetic cause for Vitamin A deficiency.
BCMO1	rs6564851	-+ Heterozygous	GT	G - 47%	Genetic cause for Vitamin A deficiency. See Vitamin A page for details.
BCMO1	rs7501331	-- Wild Type	CC	T - 21%	No genetic cause for Vitamin A deficiency.
BCMO1	rs6420424	-- Wild Type	GG	A - 43%	No genetic cause for Vitamin A deficiency.
CBS	rs4920037	-- Wild Type	GG	A - 13%	No genetic cause for reduced CBS enzyme activity.
CBS	rs2851391	-- Wild Type	CC	T - 38%	No genetic cause for reduced CBS enzyme activity.
CBS 360	rs1801181	++ Homozygous	AA	A - 29%	Genetic cause for upregulated CBS enzyme activity. Test homocysteine.
CBS 699	rs234706	-- Wild Type	GG	A - 19%	No genetic cause for upregulated CBS enzyme activity.
COMT 61 P199P	rs769224	-- Wild Type	GG	A - 2%	No genetic cause for down regulation of COMT.
COMT H62H	rs4633	-+ Heterozygous	CT	T - 237%	Genetic cause for slight down regulation of COMT. See COMT page for details.
COMT L136L	rs4818	-+ Heterozygous	GC	G - 29%	No genetic cause for down regulation of COMT.
COMT V158M	rs4680	-+ Heterozygous	GA	A - 36%	Ideal COMT status. See COMT page for details.
CYP1A2	rs762551	-+ Heterozygous	CA	C - 31%	Slow caffeine metabolizer. Limit caffeine to less than 100mg/daily.
CYP1B1 L432V	rs1056836	++ Homozygous	GG	G - 42%	Genetic cause for elevated 4-OH estradiol. Test hormones with your doctor.
CYP2E1 *6	rs6413432	-- Wild Type	TT	A - 16%	No genetic cause for NAPQI toxicity from Acetaminophen.
DAOA/DAAO	rs3741775	++ Homozygous	CC	C - 31%	Genetic risk for Schizophrenia. Test Vitamin B2 levels. Consider SAMe.
DAO (AOC1)	rs2052129	-- Wild Type	GG	T - 23%	No genetic cause for elevated histamine.
DAO (AOC1)	rs10156191	-+ Heterozygous	CT	T - 31%	Genetic cause for reduced DAO enzyme activity. See Histamine page for details.
DHFR	rs1643649	-+ Heterozygous	CT	C - 22%	Genetic cause for low tetrahydrofolate. Avoid Bactrim, EGCG,and grape seed.
Factor 5	rs6025	-- Wild Type	CC	T - .00%	No genetic cause for increased risk of thrombosis.
FADS1	rs174548	-- Wild Type	CC	G - .00%	No genetic cause for phosphatidylcholine deficiency.
FADS1(MYRF)	rs174537	-- Wild Type	GG	T - 30%	Genetic cause for high Arachidonic Acid levels. Limit Omega 6 foods.
FADS2	rs1535	-- Wild Type	AA	G - 32%	No genetic cause for decreased DHA production. Associated with High IQ.
FOLR2	rs651933	-- Wild Type	GG	A - 45%	No genetic cause for intracellular folate deficiency.
FUT2	rs602662	-- Wild Type	GG	A - 32%	Genetic cause for low serum B12 levels. See B12 page for details.
FUT2	rs492602	-- Wild Type	AA	G - 32%	No genetic cause for B12 deficiency.
FUT2	rs601338	-- Wild Type	GG	A - 32%	Norovirus susceptibility. Secretor status.
G6PD	rs1050828	-- Wild Type	CC	T - 3%	No genetic need to avoid IV Vitamin C & H202.
G6PD	rs1050829	-- Wild Type	TT	C - 9%	No genetic need to avoid IV Vitamin C & H202.
G6PD	rs5030868	-- Wild Type	GG	A .00%	No genetic need to avoid IV Vitamin C & H202.
GPX1	rs1050450	++ Homozygous	AA	A - 2%	Genetic cause for glutathione deficiency and heavy metal toxicity. Test for both.
GSTP1	rs1138272	-- Wild Type	CC	T - 3%	No genetic cause for inability to detoxify.
GSTP1	rs1695	-- Wild Type	AA	G - 35%	No genetic cause for inability to detoxify.
HFE H63D	rs1799945	-- Wild Type	CC	G - 7%	No hemochromatosis risk
HFE C282Y	rs1800562	-- Wild Type	GG	A - 1%	No hemochromatosis risk
HFE S65C	rs1800730	-- Wild Type	AA	T - .00%	No hemochromatosis risk

Gene	RS#	Result	Client	Minor	Short Description
HNMT	rs1050891	-- Wild Type	AA	G - 20%	No genetic cause for elevated serum levels of histamine.
MAOA T1410C	rs1137070	-- Wild Type	CC	T - 44%	Genetic cause for reduced MAO activity & elevated serotonin levels.
MAOA	rs6323	-+ Heterozygous	GT	G - 37%	Ideal MAO-a status. See MAO page for details.
MAOA	rs72554632	-- Wild Type	CC	T - .00%	No genetic cause for MAO deficiency.
MAOB	rs1799836	-- Wild Type	TT	C - 45%	Genetic risk for decreased dopamine and Parkinson's disease.
**Notice: MAO is a X linked gene and is only passed down from the maternal line. Male Children are technically "hemizygous."					
MAT1A R264H	rs72558181	-- Wild Type	CC	T - .00%	No genetic cause for hypermethioniemia.
MMAB	rs2287182	-- Wild Type	CC	T - 13%	No genetic cause for methylmalonic acidemia.
MTHFS	rs6495446	-- Wild Type	CC	T - 29%	No genetic cause for folinic acid or Leucovorin avoidance. See Folate page.
MTHFD1	rs2236225	-- Wild Type	GG	A - 34%	No genetic cause for 5,10 methylenetetrahydrofolate deficiency.
MTHFR A1298C	rs1801131	++ Homozygous	GG	G - 25%	Genetic cause for Folate deficiency. See Folate page for details.
MTHFR C677T	rs1801133	-- Wild Type	GG	A - 24%	No genetic cause for Folate deficiency.
MTR	rs1805087	-+ Heterozygous	GA	G - 21%	Research inconclusive
MTRR	rs1801394	-+ Heterozygous	GA	G - 36%	Genetic cause for B12 deficiency. See B12 page for details. Test homocysteine.
MTRR	rs1532268	-+ Heterozygous	CT	T - 27%	Genetic cause for B12 deficiency. See B12 page for details. Test homocysteine.
MUT	rs1141321	-- Wild Type	CC	T - 26%	No genetic cause for B12 deficiency.
MUT	rs9369898	++ Homozygous	GG	G - 40%	Genetic cause for methylmalonic acidemia. Consider adenosylcobalamin.
NOS3	rs1799983	-+ Heterozygous	GT	T - 17%	Genetic risk for small artery disease due to low Nitric Oxide. Use l-arginine.
NOS3	rs2070744	-- Wild Type	TT	C - 23%	Genetic cause for high Nitric Oxide levels. Use Hydroxycobalamin.
NQO1	rs1800566	-+ Heterozygous	GA	A - 28%	Genetic cause for increased oxidative stress. Test urinary 8-OHdG.
PEMT	rs4244593	-- Wild Type	GG	T - 42%	No genetic cause for phosphatidylcholine deficiency.
PEMT	rs4646406	-+ Heterozygous	TA	A - 28%	Genetic cause for phosphatidylcholine deficiency. Consider supplementation.
PEMT	rs7946	-+ Heterozygous	CT	T - 30%	Genetic cause for phosphatidylcholine deficiency. Consider supplementation.
PON1 Q192R	rs662	-- Wild Type	TT	C - 45%	No tendency for insecticide sensitivity.
Prothrombin (F2)	rs1799963	-- Wild Type	GG	A - .00%	No genetic cause for thrombosis or cerebral stroke.
SHMT1	rs1979277	-- Wild Type	GG	A - 23%	No genetic cause for inadequate methylation.
SLC19A1	rs1051266	-+ Heterozygous	CT	T - 48%	Genetic cause for Folate deficiency. Test RBC Folate.
SOD1	rs2070424	-- Wild Type	AA	G - 24%	No genetic cause for high levels of SOD1.
SOD1	rs4998557	-- Wild Type	GG	A - 33%	No genetic cause for oxidative stress.
SOD2	rs2758331	-+ Heterozygous	CA	A - 33%	Genetic cause of oxidative stress. Consider SOD supplementation.
SOD2	rs4880	-+ Heterozygous	AG	G - 41%	Genetic cause of oxidative stress. Consider SOD supplementation.
SOD3	rs1799895	-+ Heterozygous	CG	G - 2%	Genetic cause of oxidative stress. Consider SOD supplementation.
SUOX(A628C)	rs7297662	-- Wild Type	GG	A - 47%	No genetic cause for sulfite oxidase deficiency.
SUOX(S370S)	rs773115	-- Wild Type	CC	G - .00%	No genetic cause for sulfite oxidase deficiency.
TCN1	rs526934	-- Wild Type	AA	G - 19%	No genetic cause for B12 deficiency.
TCN2	rs1801198	-+ Heterozygous	CG	G - 42%	Genetic cause for low serum B12 levels. See B12 page for details.
TNF C857T	rs1799724	-- Wild Type	CC	T - 12%	No genetic cause for inflammation.
TNF	rs1800629	-+ Heterozygous	GA	A - 9%	Genetic cause for high levels of inflammation. See Inflammation page.
VDR TAQ	rs731236	-- Wild Type	AA	G - 38%	No genetic cause for Vitamin D deficiency.
VDR-BSM	rs1544410	-- Wild Type	CC	T - 29%	No genetic cause for Vitamin D deficiency.
VDR-FOK	rs2228570	-- Wild Type	GG	A - 32%	No genetic cause for Vitamin D deficiency.

Additional Combo SNPs

Gene	RS#	Result	Client	Minor	Short Description
MMp9 C1562T	rs3918242	-+ Heterozygous	CT	T	See PubMed.
Fcrl3-3-169C	rs7528684	-- Wild Type	AA	G	No genetic cause for autoimmunity.
IRF1	rs9282763	-+ Heterozygous	CT	C	See PubMed.

MaxFood SNP Report

Gene	RS#	Result	Client	Minor	Short Description
Diet Section					
FABP2 Ala54Thr	rs1799883	-- Wild Type	TT	C	Genetic cause for refined carbohydrate sensitivity.
KCTD10	rs10850219	-- Wild Type	GG	C	Genetic cause for reduced HDL levels on a high carb diet. Avoid refined carbs.
PLIN	rs894160	-- Wild Type	CC	T	No genetic cause for BMI change with carb consumption.
LIPC	rs1800588	++ Homozygous	TT	T	High complex carb diet will lower BMI. Increase fiber intake.
FADS1(MYRF)	rs174537	-- Wild Type	GG	T	No genetic cause for altered Omega 6 levels.
APOA2	rs5082	-+ Heterozygous	GA	A	Genetic reason to consume less than 45% of calories from fat.
FABP2 Ala54Thr	rs1799883	-- Wild Type	TT	C	Genetic cause for saturated fat sensitivity. See Fat page for details.
FABP2 Ala54Thr	rs1799883	-- Wild Type	TT	C	No genetic cause for higher fatty acids in the blood stream when eating fat.
FABP2 Ala54Thr	rs1799883	-- Wild Type	TT	C	No genetic cause for higher triglycerides.
ADIPOQ	rs17300539	-- Wild Type	GG	A	Genetic reason to avoid a high fat diet.
PPARG	rs1801282	-- Wild Type	CC	G	No genetic reason to consume extra monounsaturated fats.
ADIPOQ	rs17300539	-- Wild Type	GG	A	No genetic reason to consume extra monounsaturated fats.
PPARG	rs1801282	-- Wild Type	CC	G	Genetic reason to consume extra polyunsaturated fats.
APOA2	rs5082	-+ Heterozygous	GA	A	Genetic cause for more efficient lipid metabolism.
Vitamin Risks					
MTHFR C677T	rs1801133	-- Wild Type	GG	A	No genetic cause for Folate deficiency.
MTHFR A1298C	rs1801131	++ Homozygous	GG	G	Genetic cause for Folate deficiency.
BCMO1	rs12934922	-- Wild Type	AA	T	No genetic cause for Vitamin A deficiency.
BCMO1	rs7501331	-- Wild Type	CC	T	No genetic cause for Vitamin A deficiency.
MTHFR	rs1801133	-- Wild Type	GG	A	No genetic cause for Vitamin B2 deficiency.
NBPF3	rs4654748	-- Wild Type	CC	T	Genetic cause for Vitamin B6 deficiency.
SLC23A1	rs33972313	-- Wild Type	CC	T	No genetic cause for Vitamin C deficiency.
GC	rs2282679	-+ Heterozygous	GT	G	Genetic cause for Vitamin D deficiency.
INTERGENIC	rs12272004	-- Wild Type	CC	A	Genetic cause for Vitamin E deficiency.

Gene	RS#	Result	Client	Minor	Short Description
Food Intolerances					
CCR3	rs6441961	-+ Heterozygous	CT	C	Genetic cause for gluten intolerance. See Food Sensitivity page for details.
HLA-SNP	rs9275596	-+ Heterozygous	CT	C	Genetic cause for peanut allergy. Test serum IgE or patch test.
HLA-DQ8	rs7454108	-- Wild Type	TT	C	No genetic cause for gluten intolerance.
HLA-DQ2.5	rs2187668	-- Wild Type	CC	T	No genetic cause for gluten intolerance.
IL21	rs13119723	-- Wild Type	AA	G	No genetic cause for gluten intolerance.
IL21	rs6822844	-- Wild Type	GG	T	No genetic cause for gluten intolerance.
MYO9B	rs2305764	-+ Heterozygous	GA	G	Genetic cause for gluten intolerance. See Food Sensitivity page for details.
MCM6	rs4988235	-+ Heterozygous	GA	A	No genetic cause for lactose intolerance. See Food Sensitivity page for details.
APOA2	rs5082	-+ Heterozygous	GA	A	No genetic cause for weight gain when consuming dairy.
Disease Risks					
MYO9B	rs2305764	-+ Heterozygous	GA	G	Genetic cause for GI diseases. See Food Sensitivity page for details.
Eating Habits					
FTO	rs8050136	-+ Heterozygous	CA	A	Genetic cause for increased appetite. Watch portion control.
MC4R	rs17782313	-+ Heterozygous	CT	C	Genetic cause of consuming excessive calories. Watch portion control.
MC4R	rs17782313	-+ Heterozygous	CT	C	Genetic cause of consuming excessive fat from calories. Count macros.
ANKK1/DRD2	rs1800497	-- Wild Type	GG	A	No genetic cause for addictive eating behavior.
FTO	rs9939609	-- Wild Type	TT	A	No genetic cause for increased appetite.
LEPR	rs2025804	-+ Heterozygous	AG	A	Genetic cause for lower resting metabolism.
NMB	rs1051168	-- Wild Type	GG	T	No genetic cause for leptin resistence.
FTO	rs9939609	-- Wild Type	TT	A	No genetic cause for leptin resistence.
LEPR	rs2025804	-+ Heterozygous	AG	A	No genetic cause of increased desire for snacking.
MC4R	rs17782313	-+ Heterozygous	CT	C	No genetic cause of increased desire for snacking.
FTO	rs9939609	-- Wild Type	TT	A	No genetic cause of binge or emotional eating.
FTO	rs9939609	-- Wild Type	TT	A	No genetic cause of binge or emotional eating.
TAS2R38	rs713598	-- Wild Type	CC	G	Genetic cause for ability to taste bitter foods. Eat 9 servings of veggies/day.
Obesity & Weight loss					
ADRB3	rs4994	-- Wild Type	AA	G	No genetic cause for higher BMI. Eat according to Carb page.
FTO	rs1558902	++ Homozygous	AA	A	Genetic cause for obesity. Eat according to Carb page.
MC4R	rs17782313	-+ Heterozygous	CT	C	Genetic cause for obesity. Eat according to Carb page.
ITGB2	rs235326	-+ Heterozygous	GA	G	No genetic cause of obesity. Eat according to Carb page.
ADIPOQ	rs17300539	-- Wild Type	GG	A	No genetic cause of obesity. Eat according to Carb page.
APOA2	rs5082	-+ Heterozygous	GA	A	No genetic cause of obesity. Eat according to Carb page.
FTO	rs9939609	-- Wild Type	TT	A	No genetic cause of obesity. Eat according to Carb page.
FTO	rs8050136	-+ Heterozygous	CA	A	Genetic cause for losing less fat with exercize. Concentrate on ideal diet.
FTO	rs16945088	-- Wild Type	AA	G	No genetic cause for inability to lose weight.
PPM1K	rs1440581	-+ Heterozygous	CT	C	Genetic cause for inability to lose weight and control insulin with diet. Exercise.
ADIPOQ	rs17300539	-- Wild Type	GG	A	Genetic cause for weight gain after dieting. See Carb page for ideal diet.
PPARG	rs1801282	-- Wild Type	CC	G	No genetic cause for inability to lose weight with diet.
ACSL5	rs2419621	-- Wild Type	CC	T	Genetic cause for weight loss with diet alone. See Carb page for ideal diet.
PLIN	rs894160	-- Wild Type	CC	T	Genetic cause for fat loss with calorie restricted diet. Reduce caloried by 10%.
PLIN	rs894160	-- Wild Type	CC	T	Genetic need for time-restricted eating. Do not eat past 6pm for weight loss.

Gene	RS#	Result	Client	Minor	Short Description
Blood Sugar & Diabetes					
ADRA2A	rs10885122	-- Wild Type	GG	T	No genetic cause for diabetes/insulin issues.
IRS1	rs2943641	-- Wild Type	CC	T	No genetic cause for diabetes/insulin issues.
ADIPOQ	rs17300539	-- Wild Type	GG	A	Genetic cause for elevated blood sugar/diabetes. Avoid refined carbohydrates.
PPARG	rs1801282	-- Wild Type	CC	G	No genetic cause for diabetes/insulin issues.
ADRB2	rs1042714	-+ Heterozygous	GC	G	No genetic cause for diabetes/insulin issues.
FTO	rs8050136	-+ Heterozygous	CA	A	Genetic cause for elevated blood sugar/diabetes. Avoid refined carbohydrates.
FTO	rs9939609	-- Wild Type	TT	A	No genetic cause for diabetes/insulin issues.
PPARG	rs1801282	-- Wild Type	CC	G	No genetic cause for diabetes/insulin issues.
ADIPOQ	rs17300539	-- Wild Type	GG	A	Genetic cause for obesity and Type II Diabetes.
Blood Lipids					
FADS1	rs174537	-- Wild Type	GG	T	Genetic cause for elevated cholesterol. Test VLDL and Triglycerides yearly.
LPL	rs328	-- Wild Type	CC	G	No genetic cause for high triglycerides.
KCTD10	rs10850219	-- Wild Type	GG	C	Genetic cause for low HDL. Test yearly.
LIPC	rs1800588	++ Homozygous	TT	T	Genetic cause of low HDL with consumption of animal fat. Pescaterian Diet.

GENE	rsID	Result	Client	Minor	Description
Muscle Performance					
ADRB3	rs4994	++ Homozygous	AA	A	No genetic cause for elite endurance athletic ability.
NRF2	rs7181866	-+ Heterozygous	GA	G	Genetic cause for elite endurance athletic ability.
PPARGC1A	rs8192678	-- Wild Type	CC	T	Genetic cause for elite endurance athletic ability.
ADRB2	rs1042713	-- Wild Type	GG	A	No genetic cause for elite endurance athletic ability.
GABPB1 (NRF2)	rs12594956	-+ Heterozygous	CA	A	Genetic cause for endurance athletic ability.
GABPB1 (NRF2)	rs8031031	-- Wild Type	CC	T	No genetic cause for endurance athletic ability.
LIPC	rs1800588	++ Homozygous	TT	T	No genetic cause for enhanced benefit from endurance training.
LPL	rs328	-- Wild Type	CC	G	Genetic cause for enhanced benefit from endurance training.
PPARD	rs2016520	++ Homozygous	TT	T	Genetic cause for enhanced benefit from endurance training.
ACTN3	rs1815739	++ Homozygous	TT	T	Potential for impaired muscle performance. Likely endurance athlete.
AMPD1	rs17602729	-- Wild Type	GG	A	No genetic cause for muscle cramping post exercise.
SLC30A8	rs13266634	-+ Heterozygous	CT	T	No genetic cause for post exercise strength loss and soreness.
MSTN	rs1805086	-- Wild Type	TT	C	No genetic cause for lower peak muscle power.
VO2Max					
GABPB1 (NRF2)	rs12594956	-+ Heterozygous	CA	A	Genetic cause for higher VO2 Max.
GABPB1 (NRF2)	rs8031031	-- Wild Type	CC	T	No genetic cause for higher VO2 Max.
PPARGC1A	rs8192678	-- Wild Type	CC	T	Genetic cause for lower baseline VO2 Max.
NRF2	rs7181866	-+ Heterozygous	GA	G	Genetic cause for higher VO2 Max.
Weight loss					
LPL	rs328	-- Wild Type	CC	G	No genetic cause for greater fat loss in response to exercise.
FTO	rs8050136	-+ Heterozygous	CA	A	Genetic cause for less fat loss in response to exercise.
INSIG2	rs7566605	-+ Heterozygous	GC	G	No genetic cause for less weight loss with exercise.
LEP	rs7799039	++ Homozygous	AA	A	Genetic cause for greater fat loss and lower BMI with exercise.
FTO	rs1121980	++ Homozygous	AA	A	Genetic cause for obesity with inactivity. Exercise at least 30 minutes daily.
Resistance Training					
INSIG2	rs7566605	-+ Heterozygous	GC	G	No genetic cause for less benefits with resistance training.
IL15	rs1057972	-+ Heterozygous	TA	T	Genetic cause for more strength building with resistance training.
IL15RA	rs2296135	++ Homozygous	CC	C	Genetic cause for more strength building with resistance training.
Cardiovascular and Injury Risks					
PPARD	rs2016520	++ Homozygous	TT	T	No genetic cause for increased HDL with exercise.
NOS3	rs2070744	++ Homozygous	TT	T	No genetic cause for regulated blood pressure with exercise.
EDN1	rs5370	-+ Heterozygous	GT	T	No genetic cause for increased blood pressure with exercise if out of shape.
LIPC	rs1800588	++ Homozygous	TT	T	Genetic cause for insulin sensitivty in response to exercise.
CCL2	rs1024611	-- Wild Type	AA	G	No genetic cause for exercise induced ischemia.
ADRB2	rs1042714	-+ Heterozygous	GC	C	No genetic cause for exercise induced idiopathic venous thrombosis.
LEPR	rs1137101	++ Homozygous	GG	G	Genetic cause for exercise induced ischemic heart disease.
GDF5	rs143383	-+ Heterozygous	AG	A	Genetic cause for exercise induced osteoarthritis.
MMP3	rs679620	-+ Heterozygous	CT	C	No genetic cause for exercise induced Achilles Tendinopathy.

Additional Fitness SNPs (Experimental)

GENE	rsID	Result	Client	Minor	Description
BDKRB2	rs1799722	-- Wild Type	CC	T	
ACE	rs1799752	-- Wild Type	AA	del	
CNR2	rs2501431	++ Homozygous	AA	A	
COL5A1	rs12722	-- Wild Type	CC	T	
HIF1A	rs11549465	-+ Heterozygous	CT	T	
IGF2	rs680	-+ Heterozygous	TC	A	
IGF2BP2	rs4402960	-+ Heterozygous	GT	T	
LPL	rs320	-+ Heterozygous	GT	G	
MMP3	rs650108	-- Wild Type	GG	A	
MPP7	rs1937810	-- Wild Type	TT	C	
MSTN : Intron Varia	rs11333758	-- Wild Type	TTT	TT	
NFIB	rs13286037	-- Wild Type	TT	A	
PPARD	rs2267668	-+ Heterozygous	AA	A	
EDN1*	rs2071942	-+ Heterozygous	AG	A	
	rs4789932	-- Wild Type	GG	A/C	

SNP Information

AHCY-01

rs819147	-- Wild Type

Adenosyl homocysteinase
This enzyme is responsible for the breakdown of the amino acid, methionine. Health risk with this gene mutation is hypermethioninemia, which is associated with a short stature, low homocysteine, and low glutathione. Consider testing.

APoE

rs429358	-- Wild Type
rs7412	-- Wild Type

Your results: E3/E3 This combination is what is found most often in the general population.

The APoE gene codes for a protein responsible for moving cholesterol and fat around the body. Issues here can result in cardiovascular conditions and is a risk factor for Alzheimer's and dementia. APoE status is technically defined by these two SNPs, **rs429358** and rs7412.

e1 = rs429358(C or +) & rs7412 (T or +)
e2 = rs429358(T or -) & rs7412(T or +)
e3 = rs429358(T or -) & rs7412(C or -)
e4 = rs429358(C or +) & rs7412(C or -)

E1 is extremely rare.
E2's have a greater risk for vascular disease and hyperlipoproteinemia, cholesterol and triglyceride levels can be 2x to 3x higher, and is implicated in Parkinson's disease. E2's tend to respond well to high carb, low fat diets.
E3's is the neural type and is found in humans around 78% of the time.
E4's is implicated in Alzheimer's disease, impaired cognitive function, reduced hippocampal volume within the brain, faster progression of MS and associated with higher levels of Vit. D. E4's tend to respond well to hormone replacement therapy and high carb, low fat diets. Discuss this mutation with your PCP or cardiologist.

BCMO

rs11645428	-- Wild Type
rs12934922	-- Wild Type
rs6564851	-+ Heterozygous
rs7501331	-- Wild Type
rs6420424	-- Wild Type

beta-carotene oxygenase 1

The BCMO gene codes for the enzyme responsible for creating Vitamin A from dietary carotenoids. SNP's here can slow down the conversion of beta carotene from the diet into Vitamin A. These individuals can have low vitamin A levels while eating a diet rich in carotenoids. Interesting enough, this SNP can cause someone's skin to turn orange if they eat a large amount of beta carotene.

These SNPs may lead someone to needing Retinyl Palmitate to bypass this conversion problem. This becomes increasingly useful during times of sickness because of the necessity for vitamin A for the immune system. Discuss Vitamin A supplementation with your physician or nutritional consultant.

CBS

rs4920037	-- Wild Type
rs2851391	-- Wild Type
rs1801181 (360)	++ Homozygous
rs234706 (699)	-- Wild Type

cystathionine beta-synthase
CBS is a gene that encodes the enzyme cystathionine beta-synthase, which is responsible for using vitamin B6 to convert the amino acids homocysteine and serine to cystathionine.
Health conditions associated with this gene include homocystinuria. When homocysteine levels are affected, we see skeletal abnormalities, cognitive issues, eye problems, and abnormal blood clotting. It is important to get your homocysteine levels checked yearly, especially if this mutation is present. It is not a common practice for physicians to order homocysteine levels, so one must ask for it. Also, consider getting your B6 levels checked yearly.
CBS SNPs are typically considered to slow down the CBS enzyme, potentially causing elevated homocysteine and low levels of the master antioxidant glutathione. However, many consider RS1801181 (CBS 360) and RS234706 (CBS 699) to be up regulated SNPs. If CBS is truly upregulated it can cause excess ammonia levels and sulfite levels. Gut health becomes paramount in ammonia removal. Many products on the market are designed to increase butyrate within the colon. Butyrate helps remove ammonia from the body and is commonly assessed on extensive stool testing. As well in the case of a CBS upregulation, the neurotoxic chemical, sulfite can increase. Sulfite is broken down by the enzyme SUOX. Maximized Genetics is one of the only labs who look at SNPs within the SUOX gene. These SNPs could potential increased sulfite levels even further. CBS upregulations is also clinically seen with toxic compounds and when the body's glutathione levels become low. Focusing on lowering toxin exposure and gut health should be highly considered.

COMT

rs769224	-- Wild Type
rs4633	-+ Heterozygous
rs4818	-+ Heterozygous
rs4680	-+ Heterozygous

COMT is a gene (with multiple forms) that codes for the enzyme catechol-O-methyltransferase, which is specifically used to break down neurotransmitters in the brain, kidneys, liver, and blood. These neurotransmitters play an important role in the pre-frontal cortex of the brain, where impulsivity, planning, short term memory, and emotions are controlled. Dopamine and norepinephrine levels are particularly affected by mutations in this gene.
Health concerns related to this gene mutation generally revolve around mental health disorders. Particularly, schizophrenia has been related to a mutation in the COMT V158M snp. Other disorders that may be related are bipolar disorder, eating disorders, OCD, panic disorders, and anxiety.
Research suggests that this gene can be used to choose various medications related to ADHD.
Pain response may also be related to this mutation.
If this gene mutation is present, note that stress is a driver for inflammation and disease. Work with your functional medicine practitioner to discuss lowering inflammation throughout the body by creating a healthy diet and lifestyle. Also, consider an organic acids test to look for neurotransmitter levels.

CYP1b1

rs1056836	++ Homozygous

Cytochrome P450 family 1 subfamily B member 1
This gene encodes for an enzyme that is responsible for detoxing drugs and fats.
Mutations in this gene may lead to early onset glaucoma.
Estrogen is also broken down by this enzyme. RS1056836, when ++ is an upregulation of it's ability to produce the estrogen metabolite 4-oh-E2. This metabolite is associated with breast cancer. Discuses having a 4-oh-E2 level checked.

CYP2E1

rs6413432 (*6)	-- Wild Type

Cytochrome P450 family 2 subfamily E member 1.
This gene encodes for an enzyme that is responsible for detoxifying drugs like acetaminophen (Tylenol), ethanol, chlorzoxazone, and sevoflurane. These two SNPs, *5b and *6, increase the activity of the CYP2E1 enzyme. This enzyme speeds up conversion of acetaminophen into a toxic metabolite, NAPQI. Numerous studies show the connection between acetaminophen and liver damage, mitochondrial conditions, depletion of glutathione, neuronal death, ADHD, asthma, autism, kidney failure, gastroschisis, blood cancers, and numerous other conditions. Based upon current research, acetaminophen should be used with caution. Persons with these two mutations, could be at increased risk for oxidative/toxic damage from acetaminophen.

DAOA/DAAO

rs3741775	++ Homozygous

DAO/DAAO (rs3741775) should not be confused the DAO(AOC1) gene. It is common amongst "genetic experts" and websites to get these confused. DAAO is D-Amino-Acid Oxidase and breaks down D-Amino acids, especially targeting D-Serine. The DAO(AOC1) enzyme targets extracellular histamine and is a completely different gene.

The DAAO SNP is assumed to be an upregulation, meaning the enzyme is faster than normal. This creates an issue with lack of D-Serine. D-Serine is a NMDA receptor agonist and this SNP can result in a less NMDA activity which has been associated with schizophrenia. There can also be disruptions in glutamate receptor stimulation as well. And lastly, it's believed that SNPs here can potentially increase oxalate production. If symptoms of high oxalates are present you may want to consider a low oxalate diet.

People with DAAO sometimes respond favorably to Piracetam (500mg 2x a day), Vitamin C, and SAMe. And once again, do not get this SNP confused with AOC1.

DAO(AOC1)

rs10156191	-+ Heterozygous
rs2052129	-- Wild Type

DAO/AOC1 is an enzyme that degrades extracellular histamine. The SNP tested is assumed to downregulate of the activity of DAO, per current research. This can result in increased levels of histamine and excess histamine symptoms. The DAO enzyme is commercially available for supplementation and should be considered if laboratory histamine ranges are elevated along with this SNP.
DAO supplementation has the potential to created ammonia and hydrogen peroxide. Consider catalase and butyrate supplementation if this becomes a problem. DAO is a copper and B6 dependent enzyme so these should be evaluated as well.
Finally, a low histamine diet should be discussed with a physician or nutritional expert.

DHFR

rs1643649	-+ Heterozygous

Dihydrofolate reductase
This gene mutation is associated with megaloblastic anemia, which can cause seizures and learning difficulties. Avoid the use of folic acid and the antibiotic Bactrim. Folinic acid can help bypass this enzyme SNP.

Factor 5

rs6025	-- Wild Type

Factor 5
Mutation in this gene leads to possible venous thromboembolism. Warning: tamoxifen used for breast cancer treatment in a female with this gene mutation may lead to

FADS1

rs174548	-- Wild Type
rs174537	-- Wild Type

FADS1 (rs174548, rs174537)
This gene is used to create fatty acid unsaturation. If present, low levels of phosphatidylcholine may be present. Phosphatidylcholine is needed as a precursor to acetyl-choline, which is extremely important for neurological function. Choline, in general, is considered beneficial for memory, motivation, and muscle function. As an essential part of every cell membrane, people with this gene mutation may want to consider supplementation of phosphatidylcholine.
A second FADS1 gene (rs174537) is considered crucial in heart disease. If this gene is present, avoid consumption of Omega 6 fatty acids, as they will increase inflammation. Examples of Omega 6 fatty acids include vegetable oils (canola, sunflower, soy, corn), and grains

FADS2

rs1535	-- Wild Type

FADS2 (RS1535)
This is a gene to create fatty acid unsaturation. It is associated with lower DHA (Omega 3) levels. It is also connected to higher IQ in breastfed babies and hyperactivity in children. If this gene mutation is present, consider taking a high quality fish oil, specifically DHA.

FOLR2

rs651933	-- Wild Type

FOLR2
Folate receptor beta
This gene codes folate receptors on the cell membrane. It has a high affinity for folic acid, which can block the reduction of bioavailable folate. Research is currently limited about this SNP, but some cite its association to neural tube defects, rheumatoid arthritis, and cerebral folate transport deficiency. FOL2 receptors are found in high quantity within the placenta.

FUT2

rs602662	-- Wild Type
rs492602	-- Wild Type
rs601338	-- Wild Type

FUT2
fucosyltransferase 2
This gene is associated with vitamin B12 levels. When this mutation is present, a person may have a deficiency or an increase in B12. If a person specifically has a mutation in rs601338, he/she may be immune from Norovirus, but it creates potential gut dysbiosis. Consider B12 deficiency testing and supplementation with methylcobalamin.

G6PD

rs1050828	-- Wild Type
rs1050829	-- Wild Type
rs5030868	-- Wild Type

glucose-6-phosphate dehydrogenase
The enzyme that is encoded from this gene helps protect the red blood cell from oxidative stress. Mutations in this gene create glucose-6-phosphate dehydrogenase deficiency, which can lead to hemolytic anemia and/or neonatal jaundice. Fava beans and IV vitamin C and Hydrogen Peroxide (H202) need to be avoided with this mutation. Discuss this with your physician to see if certain medications will make this worse.

GPX1

rs1050450	++ Homozygous

glutathione peroxidase 1
With a mutation in this SNP, one has the potential for glutathione deficiency. Glutathione is protective against oxidative cellular damage, but when deficient, multiple diseases can occur. Research states that the following diseases can be linked to this gene mutation: brain tumors, breast cancer, osteoporosis, selenium deficiency induced osteoporosis, and cardiovascular risk associated with diabetes. Consider glutathione supplementation.

GSTP1

rs1138272	-- Wild Type
rs1695	-- Wild Type

Glutathione S-Transferase Pi 1 is a gene responsible for the pi class of enzymes responsible for detoxification of xenobiotics in the body. With a mutation in this gene, a person may be more susceptible to cancers. Consider glutathione testing and supplementation.

HFE

rs1799945	-- Wild Type
rs1800562	-- Wild Type
rs1800730	-- Wild Type

This class of genes is responsible for hereditary hemochromatosis, which causes difficulty with iron metabolism. This gene creates hepcidin, which regulates iron. Symptoms of hemochromatosis include issues with joints, skin, liver, heart, thyroid, and reproductive organs. People with this gene mutation may not notice issues until their 40's or later. Check iron levels, liver enzymes, and other standard lab work on a regular basis.

HNMT

rs1050891	-- Wild Type

Histamine N-Methyltransferase
This gene encodes for the enzyme histamine n-methyltransferase, which is found in cytosol and uses a major methyl donor. In the brain, histamine is a major neurotransmitter, and in the gut is controlled by DAO. Health conditions associated with a mutation in this gene include asthma and mental retardation. In ADHD children, certain food additives can be troublesome, including all food dyes and sodium benzoate.

MAO-A

rs1137070	-- Wild Type
rs6323	-+ Heterozygous
rs72554632	-- Wild Type

MAO-B

rs1799836	-- Wild Type

MAOA & MAOB
Monoamine Oxidase A and B are enzymes involved in the breakdown of neurotransmitters (serotonin, dopamine, norepinephrine, etc.). When the rs72554632 variant is present, a person may have monoamine oxidase deficiency (aka Brunner Syndrome), which causes a build of neurotransmitters in the brain. This can lead to symptoms such as impulsivity, aggression, depression, and other psychiatric issues. Considered a male issue, boys tend to be diagnosed as autistic or ADHD. Other concerns related to this gene mutation include weak muscles, repetitive hand movements, behavioral and/or developmental delays, and panic disorders (especially in females). Cheese appears to make symptoms worse. Research suggests that these genes may be connected to Parkinson's as well. If this gene mutation is present, consider organic acid testing, neurotransmitter testing, and nutrient deficiency testing on a yearly basis. The gut-brain axis needs to be monitored closely.
We report the G allele for rs 6323 as the minor allele per dbsnp and the research we reviewed indicated the G allele as being the minor and more problematic allele (increases the MAO activity). This is a highly researched SNP and some other reporting and testing companies for some reason report the opposite for this SNP.

MAT1A

rs72558181	-- Wild Type

Methionine Adenosyl transferase 1A gene mutations may create hypermethioninemia, a condition that can have significant neurological delays. Symptoms include muscle weakness, liver problems, delay in motor skills, and a cabbage smell from breath and sweat. With a mutation in this gene, diets high in protein cause a build up in the amino acid, methionine. Many people may not even realize they have this condition. Consider a lower protein diet as it relates to the rest of your genetic profile.

MMAB

rs2287182	-- Wild Type

A gene mutation here causes methylmalonic academia, which is a condition that creates difficulty in breaking down proteins and lipids. Adenosylcobalamin is the active mitochondrial form of B12 needed to create the enzyme methylmalonyl CoA mutase. Motor and other developmental delays may be of immediate concern with this genetic mutation, and long term mitochondrial issues may occur. Consider taking Adenosylcobalamin for your B12 needs.

MTHFS

rs6495446	-- Wild Type

Methenyltetrahydrofolate Synthetase
People with this gene mutation should avoid folinic acid.

MTHFD1

RS2236225	-- Wild Type

methylenetetrahydrofolate dehydrogenase, cyclohydrolase and formyltetrahydrofolate synthetase 1
If a mutation in this gene is present, a person may have low serum levels of folate (vitamin B9). Folic acid should be avoided. Health risks include neural tube defects and colorectal cancer. Levels are made worse with additional MTHFR mutations.

MTHFR	
rs1801131 A1298C	++ Homozygous
rs1801133 C677T	-- Wild Type

methylenetetrahydrofolate reductase

The MTHFR gene is responsible for coding the enzyme that processes amino acids, namely homocysteine and methionine, through the conversion of various forms of folate (vitamin B9).

Several conditions have been associated with mutations in the MTHFR gene: homocystinuria, anencephaly, spina bifida, glaucoma, high blood pressure, heart disease, psychiatric disorders, and various cancers. Research in varied and conflicting as it relates to MTHFR mutations and their impact on disease. While one can find many associations between the gene and certain conditions, reproducibility of such research is virtually non-existent.

When homocysteine levels are affected, we see skeletal abnormalities, cognitive issues, eye problems, and abnormal blood clotting. This alone may be attributed to a link between MTHFR and health conditions. It is important to get your homocysteine levels checked yearly, especially if this mutation is present. It is not a common practice for physicians to order homocysteine levels, so one must ask for it.

As a part of the methylation cycle, MTHFR mutations can affect hundreds of chemical conversions throughout the body. Multiple nutrients are involved in this cycle, but close attention is given to Folate (B9), Cobalamin (B12), P5P (B6), and Riboflavin (B2). It is important to check nutrient status yearly as well. Work with a practitioner who is proficient in both serum and intracellular lab work.

Currently, attention is given to the two main forms of MTHFR, 677 and 1298, with significantly more importance being placed on 677. There are many more forms of MTHFR, but they have no clinical significance yet. The type of mutation, both by rsid and whether it is homozygous or heterozygous, determines the effects one has. However, keep in mind that a genetic mutation does not have to be present to have difficulties with methylation or any named health condition. Attention must be given to diet and lifestyle, as well as environmental factors.

If a MTHFR mutation is present in your report, there are several things you should do:

1. Receive yearly blood work that checks homocysteine, methionine, folate, B12, B6, B2, and glutathione levels.
2. Avoid folic acid, which is the synthetic form of folate. This is common in supplements and packaged foods.
3. Talk with your physician or functional medicine doctor about supplementation.
4. Consider how this mutation works as a whole with the rest of your genetic data. Rarely does it act alone.
5. Monitor your diet and lifestyle, as this plays a larger role in your overall health than your genetic makeup.

MTR

rs1805087	-+ Heterozygous

5-methyltetrahydrofolate-homocysteine methyltransferase
This gene encodes for the enzyme, methionine synthase, which is needed for the metabolism of methionine, and amino acid. It requires the use of methylcobalamin (an active form of B12). This gene mutation can lead to homocystinuria. When homocysteine levels are affected, we see skeletal abnormalities, cognitive issues, eye problems, and abnormal blood clotting. It is important to get your homocysteine levels checked yearly, especially if this mutation is present. It is not a common practice for physicians to order homocysteine levels, so one must ask for it. This genetic mutation has also been suggested in Down Syndrome formation.

MTRR

rs1801394	-+ Heterozygous
rs1532268	-+ Heterozygous

5-methyltetrahydrofolate-homocysteine methyltransferase reductase
This gene encodes for the enzyme, methionine synthase reductase, which is needed for the metabolism of methionine synthase. This gene mutation can lead to homocystinuria. When homocysteine levels are affected, we see skeletal abnormalities, cognitive issues, eye problems, and abnormal blood clotting. It is important to get your homocysteine levels checked yearly, especially if this mutation is present. It is not a common practice for physicians to order homocysteine levels, so one must ask for it. This genetic mutation has also been suggested in Down Syndrome formation.

MUT

rs1141321	-- Wild Type
rs9369898	-- Wild Type

methylmalonyl CoA mutase
This gene encodes for an enzyme that is responsible for breaking down lipids and proteins for energy use in the mitochondria. With a mutation here, methylmalonic acidemia is a concern. Symptoms occur in early infancy and include failure to thrive, lethargy, vomiting, weak muscle tone, and fatigue. If severe, survival expectation is low. Long term effects may be pancreatitis, kidney disease, and intellectual disabilities. Consult an expert geneticist for official diagnosis. MUT mutations can benefit from additional Adeno-B12.

NOS3

rs1799983	-+ Heterozygous
rs2070744	-- Wild Type

Nitric Oxide Synthase 3 is an enzyme that allows for the production of nitric oxide from L-arginine. Nitric oxide is needed for vasodilation of arteria vessels and plays a major role in heart health. With this gene mutation, deficiencies in nitric oxide may be a concern. This can lead to ischemic stroke, myocardial infarction, essential hypertension, pre-eclampsia, and Alzheimer's. Consider getting your NO levels checked and/or supplement with L-arginine. Talk with your functional medicine provider before using supplementation. Be sure to have full cardiometabolic lab work done twice a year.

NQO1

rs1800566	-+ Heterozygous

NAD(P)H Quinone Dehydrogenase 1
Mutations in this gene have been associated with breast cancer, lung cancer, tardive dyskinesia, and Alzheimer's.

PEMT

rs4244593	-- Wild Type
rs4646406	-+ Heterozygous
rs7946	-+ Heterozygous

Phosphatidylethanolamine N-Methyltransferase
Mutations in this gene may lead to deficiencies in phosphatidylcholine, a phospholipid needed for cell membrane integrity. Health concerns related to this class of gene mutations include: endometriosis, orofacial clefts, and non-alcoholic fatty liver disease. Phosphatidylcholine is the precursor to Acetylcholine, a neurotransmitter responsible for memory formation. Clinically we have observed increased memory retention and function with Phosphatidylcholine supplementation with these SNPs.
Discuss supplementation with your practitioner.

PON1

rs662	-- Wild Type

paraoxonase 1 gene
This gene allows for the breakdown of toxic chemicals, especially pesticides, medications, and heavy metals. Mutations in this gene allow for susceptibility to heart disease, diabetes, atherosclerosis, and pesticide poisoning. This is especially critical for microvascular issues related to eyesight in diabetes. Make sure you are choosing organic food sources and avoiding pesticide use. Some advanced laboratories offer pesticide and environmental toxin testing.

Prothrombin

rs1799963	-- Wild Type

Coagulation factor II, thrombin
This gene is needed for proper blood coagulation. Mutations in this gene lead to an increase of thrombosis, loss of pregnancy, and cerebral stroke. Follow an anti-inflammatory, Mediterranean Diet. Discuss testing options with your physician.

SHMT

rs1979277	-- Wild Type

Serine Hydroxy methyltransferase 1
RS1979277 SNPs can reduce the function by up to 50%. Research suggests this gene is associated with Adult Acute Lymphocytic Leukemia and cardiovascular disease. SNPs here can lower glycine levels in the body resulting in decreased glutathione and cartridge production. Consider increasing glycine containing foods. As well, this can SNP can increase Uracil levels and is potentially implicated in some cancers. B6 in the P-5-P form may be beneficial to helping SHMT function.

SLC19A1

rs1051266	-+ Heterozygous

This gene regulates the transport and levels of intracellular folate. Consider RBC folate testing and supplementation. This gene is associated with methotrexate metabolism difficulty and colorectal cancer. Synthetic Folic acid should be avoided.

SOD1

rs2070424	-- Wild Type
rs4998557	-- Wild Type

superoxide dismutase 1
This gene encodes for superoxide dismutase, and enzyme that binds with copper and zinc to break down free radicles. Mutations in this gene are associated with amyotrophic lateral sclerosis (ALS), which is a disease characterized by muscle weakness and wasting. It is thought that this mutation increases the chance of oxidative stress on the motor neuron.

SOD2

rs2758331	-+ Heterozygous
rs4880	-+ Heterozygous

Superoxide dismutase 2
Mutations of this gene have been linked to idiopathic cardiomyopathy, premature aging, cancer, and sporadic motor neuron disease. Consider SOD supplementation.

SOD3

rs1799895	-+ Heterozygous

Superoxide dismutase 3
This gene is associated with riding the body of free radicals and oxidative stress; however, this mutation is linked to an increase of oxidative stress. This gene mutation is associated with copper and folate pathways. Consider SOD supplementation.

SUOX

rs7297662	-- Wild Type
rs773115	-- Wild Type

Sulfite oxidase
This gene encodes for an enzyme that is needed in the final stages of degradations of sulfur containing amino acids, cysteine and methionine. Specifically the degradation of Sulfite into sulfate. Mutations in this gene are linked to early childhood neurological conditions, especially seizures and sulfite sensitivities. Consider molybdenum supplementation to help improve SUOX activity.

TCN1/2

rs526934	-- Wild Type
rs1801198	-+ Heterozygous

Transcobalamin 1
This gene is necessary for the transportation of vitamin B12. With a mutation here, consider testing and supplementation with methylcobalamin. Research suggests difficulty with digestion and stomach acid. With a mutation in this gene, B12 levels may be low. Peripheral neuropathy is common with this deficiency. Consider intracellular nutrient testing and B12 supplementation.

TNF

rs1799724	-- Wild Type
rs1800629	-+ Heterozygous

Tumor necrosis factor
This gene is responsible for creating a pro-inflammatory cytokine that has a number of duties, including cell proliferation and differentiation, apoptosis, and lipid metabolism. A mutation here can lead to cancer, autoimmune disease, and insulin resistance. It has been specifically connected to rheumatoid arthritis, juvenile idiopathic arthritis, migraines, asthma, and narcolepsy. Follow a low-inflammatory diet and work with a functional medicine provider to reduce autoimmune chances.

VDR

rs731236	-- Wild Type
rs1544410	-- Wild Type
rs2228570	-- Wild Type

VDR
This gene encodes for the receptor site of vitamin D, which is responsible for regulating calcium and phosphate. Health concerns that are directly connected to a mutation in this gene include intervertebral disc disease and rickets. Consider testing vitamin D levels and supplementation of D3.

Client: Your genotype.
Minor: The genotype that is found least in nature.
Wild Type: The genotype that is found most often in nature, this is reported as green. This isn't always ideal.
Homozygous: This means you tested for both copies of the minor type allele. This typically has more severe issues.
Heterozygous: : This means you tested for one copy of the minor allele and one copy of the wild type allele.
Gene: This is the specific gene we are looking at for variations.
RS#: This is the specific variation within the gene. There are multiple locations within a gene for potential variations, all of which can indicate a different issue or severity.