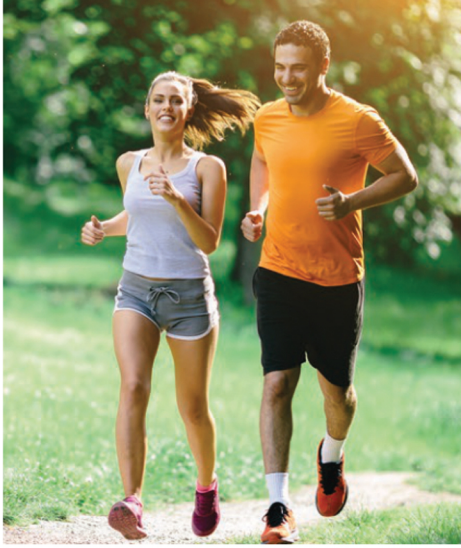
Love my Health™ PRO

LIFESTYLE GENETIC TEST



My health, explained

DNA Labs™

GENETIC TESTING SOLUTIONS

Dina Labs
Test date: 15/06/2022


Diet and Heart Health


Sensitivities


Specific Nutrient Needs


Physical Fitness


Brain Health


Detox


Obesity Risk


Hormonal Health

My Genes. My Health.

We are delighted that you have chosen to purchase our LoveMyHealth Lifestyle Genetic Test so that you can begin to live the best life you can! In your personalized report, you will find very helpful and comprehensive information about you. We designed our report with you in mind; easy to use and understand, and actionable. The DNA Labs team is excited to present your unique results to you. Just click, explore, and learn how your very own "Owners Manual", your DNA, can reveal so much valuable information about you!

Using cutting edge genetic technology, we have analyzed your DNA, looking at 127 unique variants across 96 genes that collectively dictate how your “owners manual” helps to shape your personalized action plan. Based on this information, we have created actionable nutritional, exercise, and lifestyle recommendations for you related to dietary and nutrient needs, food sensitivities, fitness planning and physical health management, as well as cardiovascular and metabolic health. Each section of the report provides you with direct changes that you can make today and empowers you to improve your health and well-being!

Thanks for purchasing our Love My Health genetic test; we hope that you use the actionable information within your report to begin to live life great!

My Results: Diet and Heart Health

A one-size-fits-all approach does not provide for nutritional needs that vary by age, gender, genetic background and other factors. In this section, we focus on how consuming different types of fats and carbohydrates affects your risk of developing certain diseases such as obesity and diabetes. An individually tailored diet that strikes your delicate balance is key to optimizing your body's functionality and overall health.

Carbohydrate Consumption

Carbohydrates are the body's main source of fuel, needed for physical activity, brain function, and organ operation. Carbohydrates, for the most part, come in two "flavours": refined/white grains and whole grains. Whole grains are grains that have been left completely in tact, meaning that they have all of the good parts of the grain, including those with the most vitamins and minerals, which perform a variety of functions within the body, and fibre, which can help to control cholesterol and blood glucose levels in your body. The question is, what kind of carbohydrates should you consume and in what quantities? Here, with the help of your genetics, we shed light on this question.

Take Action:

Keep your carbohydrate intake to under *41.65% of your daily calories*, or below *208g/day* for a 2000 calorie diet.

Why?

Higher intake of carbohydrates may increase your risk of developing Type 2 Diabetes via increases in your insulin synthesis and fasting insulin levels, combined with decreases to your insulin sensitivity.

It's in your genes

You have genetic variants in the CRY1 and TCF7L2 genes associated with an **increased risk of abnormal glucose balance and insulin resistance when you consume too many carbohydrates** (*> 41.65% of daily calories*) in your diet.

Fat Consumption

There are many different types of dietary fats, including saturated fat, omega-3 fatty acids, omega-6 fatty acids, polyunsaturated fat, and monounsaturated fat, all classified by their chemical structure. Each type of fat plays unique and important biological roles (including energy storage, insulating and protecting our vital organs, and helping to control growth, immune function, reproduction, and other aspects of basic metabolism), and each is required in different quantities for optimal health. There are several genes that regulate the effects of different types of fat on your body. In this section, we look at these genes and based on your DNA, we shed light on the fats that are likely to be the healthiest for you to consume, and those that you should limit or avoid.

Take Action:

• **Reduce** saturated fat **intake** in your diet, trying to keep it to less than *10%* of your daily calories (22g/day, based on a 2000 calorie diet).
- Saturated fat is found in animal products such as beef, poultry skin, lard, cheese, and butter. It is also found in coconut oil.
- Instead, choose vegetable-based fats such as avocado oil, nuts and seeds, and lower fat meats and dairy products.
- check out your 'Lactose' section under 'Sensitivities' to see if you should limit lactose and/or consider lactose-free dairy products.

• Ensure that you are **consuming enough omega-3 fatty acids** in your diet. The recommended daily allowance for omega-3 is *1.6g/day*.
- Consume up to twice this amount (3g) daily to prevent metabolic syndrome.
- Sources of omega-3 fatty acids include fish, flaxseeds, walnuts, chia seeds, and avocados.
- In the 'Specific Nutrient Needs' section, check your ability to convert plant based omega-3 fatty acids (ALA) to active EPA and DHA before deciding on the best omega 3-sources for you.

• Also, **decrease your consumption of foods rich in** omega-6 fatty acids. These foods include safflower oil, grapeseed oil, sunflower oil, corn oil, soybean oil, and cottonseed oil.

• It is recommended that you **follow Health Canada's fat intake guidelines** and consume overall fat as *30%* of your daily caloric intake (approximately 65g based on a 2000 calorie diet).

Why?

According to your test results, you may be at an elevated risk of overeating, weight gain, obesity, insulin resistance and metabolic syndrome with higher saturated fat intake.

• You may also have an increased risk of obesity and metabolic syndrome, especially with low omega-3 and high omega-6 fatty acid intake and you may be more prone to inflammatory conditions.
- Ensuring you get enough omega-3 fatty acids can help to keep your triglycerides in check, which can in turn, reduce your risk of metabolic syndrome and improve associated features such as high blood pressure, waist circumference, insulin resistance, and dyslipidemia.

It's in your genes

• You have genetic variants in at least one of the genes that impact saturated fat intake, which may put you at a **higher risk of certain adverse health conditions when you consume higher amounts of saturated fat**.

• You also have variants in at least one of the genes that impacts your omega-3 fatty acid needs, which may put you at a **higher risk of certain adverse health conditions if you have insufficient omega-3 fatty acid intake**.

Eating for Heart Health

Whether you have a genetic predisposition to heart disease or not, your diet plays a central role in heart health. Your diet can influence your risk of Type 2 Diabetes and heart disease - for example, it's important to ensure that your diet is designed to help you maintain optimal triglyceride and cholesterol levels. With guidance based on your specific genetic predispositions, you can modify your diet to help minimize risk of cardiovascular disease. Find out the diet that is most heart-healthy for you!

Take Action:

See your Health Care Practitioner about having your triglyceride levels tested.

• If they are high, help to lower them by following a mediterranean diet, working on losing weight, reducing your sugar intake, increasing your intake of complex carbohydrates and omega-3 fatty acids, heavily reducing your alcohol intake and exercising regularly.

- Consider taking a daily fish oil supplement that contains at least *1000-5000mg* EPA + DHA and containing a ratio of EPA:DHA between 0.5:1 and 2:1.

Why?

According to your test results, you may be prone to having higher levels of triglycerides which is a risk factor for heart disease.

• The mediterranean diet has been shown to be effective at helping to reduce triglyceride levels.

It's in your genes

• The MLXIPL gene is involved in the activation of triglyceride synthesis.

• The LPL gene encodes lipoprotein lipase, an enzyme that helps to break down the fat (triglycerides) travelling through our blood as well as promotes the uptake of lipoproteins into cells.

- You have at least one genetic variant in the MLXIPL/LPL genes that is associated with an **elevated risk of having higher than ideal triglyceride levels**.

• The CLOCK gene is involved in the regulation of our body's circadian rhythm, which can affect our ability to synthesize and break down fats properly.

- You have a typical version of the CLOCK gene, meaning that your genes involved in circadian rhythm are **not associated with an increased risk of type 2 diabetes, obesity, or cardiovascular disease** .

Risk for Heart Disease

Heart disease includes conditions that involve a narrowing or blockage of blood vessels, known as atherosclerosis, which can lead to a heart attack, chest pain (angina) or stroke. While many environmental factors influence development, particular genes are shown to significantly impact one's predisposition. These contribute to changes within the lining of the vasculature that lead to plaque development and eventually atherosclerosis. Prevention starts with knowing your risk. Find out your genetic risk profile and specific lifestyle interventions to address factors such as, oxidative stress and inflammation, that contribute to the onset of heart disease.

Take Action:

• Following the DASH diet (Dietary Approaches to Stop Hypertension) can help prevent cardiovascular disease. This involves the incorporation of the following foods into your diet: green leafy vegetables, berries, nuts, whole grains, fish and beans.
• **Avoid trans fats** and **limit intake of saturated fats**.
- Red meats and high fat dairy products contain high amounts of saturated fats, so consumption should be reduced.
- Possible alternatives for fat consumption include: avocados, vegetable oils (olive, canola, sunflower and sesame) and nut butters.
• In order to decrease cholesterol levels, it is recommended to **increase your consumption of:**
- fiber;
- plant proteins such as organic soybeans, edamame, tofu and nuts, such as almonds and walnuts; and
- include 1 to 4 servings of fish each week.
• **Stay active.** Participating in at least 30 minutes of physical activity daily can benefit heart health. To decrease the risk of cardiovascular disease, try to walk and stand when possible and avoid sitting for long periods of time.
• **Limiting consumption of alcohol** and **avoiding smoking** will also aid in reducing your risk of cardiovascular disease.
• Maintaining your ideal body weight as well as managing diabetes and hypertension are helpful in the prevention of cardiovascular disease.

Why?

Though there are several other factors that contribute to the development of coronary heart disease, specific variants in the chromosomal area 9p21 have been found to be associated with cardiovascular disease. The risk is significantly associated with the primary events of cardiovascular disease such as fatal and nonfatal myocardial infarction, angina as well as revascularization. Based on your test results, you are in the **moderate risk** category for developing cardiovascular disease in association with 9p21. Due to this, you may be more likely to have a buildup of plaque, which would cause narrowed arteries and decreased blood flow to your heart. Decreasing your intake of fats as well as improving your diet and exercising will aid in limiting the deposition of plaque in your arteries, ultimately reducing the likelihood of cardiovascular disease development.
If you are experiencing symptoms such as chest pain (angina) during physical activity, nausea, pain or discomfort in the arms or shoulders, and shortness of breath, it is recommended that you consult a physician.

It's in your genes

There are two common variants in the chromosomal area 9p21 that are associated with increased cardiovascular disease.
• According to your DNA test results, you carry **one risk allele for each variant**, which is associated with a **1.2 to 1.3-fold increased risk** of cardiovascular disease.
Note: there are additional factors that contribute significantly to the development of cardiovascular disease. Work with your healthcare provider to understand your individual risk factors and to overcome these predispositions.

My Results: Sensitivities

Food sensitivities are adverse reactions to specific foods which are usually due to the body's inability to absorb specific nutrients, or having too much or too little enzyme activity needed for normal digestion. Although not life-threatening, consuming foods that you are sensitive to can lead to uncomfortable symptoms, often including gastrointestinal upset, if not properly managed. Depending on your genetic make-up, you may have a predisposition to being sensitive or intolerant to certain foods and substances. In this section, we discuss some of the most common food sensitivities, your predispositions, and what you can do to ensure that you are managing your sensitivities properly.

Lactose

Lactose is the primary sugar found in dairy products, and is broken down by the enzyme lactase. Genes that control the amount of lactase the body produces can predispose some individuals to have difficulties digesting lactose. People who produce less lactase are not able to fully digest lactose, and can have lactose sensitivity or intolerance. They can experience cramps, bloating and diarrhea after consuming lactose-containing dairy foods. Overall, it is estimated that about 75% of the world's population experiences some form of lactose intolerance. Read on to find out what your genes say about how your body handles lactose.

Take Action:

See your healthcare professional about being tested for lactose intolerance. You can also try:

- Eliminating or reducing dairy products from your diet to see how this makes you feel
  - If you choose to reduce your dairy consumption, be sure to include other calcium-rich foods in your diet to make up for the calcium that you may be missing
  - Consuming lactose-free dairy products
- Taking lactase supplements when consuming dairy products
  - This may help with immediate digestion of lactose found in dairy products and help to mitigate gastrointestinal symptoms associated with lactose consumption

Why?

According to your DNA test results, you are likely to be deficient in lactase, the enzyme that breaks down the milk sugar lactose, and therefore, are more likely to be lactose intolerant, which can lead you to experience uncomfortable gastrointestinal symptoms and diarrhea when consuming dairy products.

It's in your genes

The MCM6 gene helps to regulate the production of lactase, an enzyme responsible for digesting lactose.

- You have a genetic variant that is associated with a **reduction in your production of lactase**, which may make it more difficult for you to digest lactose found in dairy products.
  - Approximately *75% of the population* shares your gene variant and may have trouble digesting lactose.

Gluten

Gluten is a protein found in wheat, barley, spelt, rye, and any products made from these grains. While many gluten-containing foods are considered good sources of whole grains, some people are unable to digest gluten. It is estimated that approximately 5-10% of people worldwide suffer from some form of gluten intolerance. In its milder form, gluten intolerance can lead individuals to experience gastrointestinal issues and headaches when they consume gluten. In its more extreme form, celiac disease, there is a strong immune reaction that the body mounts against the absorptive portion of the small intestine in response to gluten consumption. As a result, nutrients cannot be absorbed into the body properly, resulting in more severe gastrointestinal and general health problems such as fatigue, weight loss, depression, bloating, and joint and muscle pain. A group of genes called the HLA complex are largely responsible for the genetic basis of gluten intolerance. Read on to find out your genetic predisposition to gluten intolerance and whether or not you should be consuming gluten.

Take Action:

- **See your health care practitioner about being tested for celiac disease**.
- You can also try **eliminating** gluten-containing foods **from your diet** to see if you experience any health improvements.

Why?

According to your DNA test results, you have a high risk of celiac disease. Celiac is an autoimmune disorder in which gluten causes damage to the villi in the small intestines.

- The intestinal damage often causes diarrhea, fatigue, weight loss, bloating, and anemia, and can lead to more serious complications.

It's in your genes

The HLA genes provide instructions for making a group of related proteins known as the human leukocyte antigen (HLA) complex. The HLA complex helps the immune system distinguish the body's own proteins from the proteins made by foreign invaders such as viruses and bacteria.

- Your HLA genotypes put you at **high risk of being sensitive to gluten**.

Caffeine

A compound found especially in coffee, tea, soft drinks and chocolate, caffeine is a stimulant of the central nervous system, and is consumed daily by millions of people worldwide. As a stimulant, caffeine has many health benefits associated with its consumption - with the right amount in your system, caffeine can reduce fatigue, improve reaction time, enhance short-term cognitive performance and concentration, and can even reduce your risk of cardiovascular disease. However, if you have too much, caffeine can elevate blood pressure and heartbeat, cause excessive jitteriness, and cause gastrointestinal disturbances. Your genetics play a large role in determining how you metabolize caffeine, how sensitive you are, and whether that one cup of coffee you had in the morning will leave you with the jitters or not. Read on to find out what your DNA says about how your body metabolizes caffeine, and how much is too much for you.

Take Action:

• For your best health, remember to keep your caffeine intake *at or below 400mg daily* (approximately three 8-ounce cups of regular coffee), or *below 300mg daily* for post-menopausal females, as per Health Canada Guidelines.

Why?

According to your DNA test results, you likely process the caffeine that you consume reasonably well.

• Sometimes you may feel jitteriness and restlessness from caffeine, whereas other times you won't.

It's in your genes

The CYP1A2 gene encodes the CYP1A2 enzyme, a member of the cytochrome P450 family of enzymes involved in metabolism of drugs and other substances, including being the key enzyme responsible for primary caffeine metabolism. Variants in this gene impact the speed at which you metabolize caffeine, which ultimately changes how your body responds to it's stimulatory effects.

• You have a genetic variant that likely makes you a **"medium metabolizer"** of caffeine, meaning that you are able to clear it from your system relatively well.

Alcohol

Alcohol is consumed by people all over the world. Many people experience a feeling of euphoria and happiness when consuming alcohol in low doses, and difficulty thinking coherently and loss of coordination with higher doses. Some people are highly sensitive to the effects of alcohol, while others have a much higher tolerance and are less likely to experience many of the effects. Some find drinking pleasant, while others have extreme negative reactions and are unable to consume alcohol at all. Your genetics play a large role in determining how you metabolize alcohol, and how likely you are to experience some of the side effects associated with drinking. Read on to find out what your genes say about how alcohol is predicted to affect you, and whether you should consider limiting or avoiding that next drink.

Recommendation:

- For your best health, Canada's Low Risk Alcohol Drinking Guidelines recommends that females consume *no more than 10 drinks per week* (no more than 2 per day) and males consume *no more than 15 drinks per week* (no more than 3 per day).
- To avoid developing a habit, plan non-drinking days every week.

Why?

According to your DNA test results, when you consume alcohol, you are likely to experience typical effects such as slurred speech, drowsiness, emotional changes, sleep disruption, nausea and potentially vomiting, if alcohol is consumed in excess, as well as hangovers the following day, leaving you feeling unwell.

It's in your genes

The ALDH2, ADH1B and ADH1C genes all encode proteins involved in different steps in the alcohol metabolism pathway. Variants in ALDH2 affect the way that alcohol is metabolized, while variants in ADH1B/C relate more to the speed of alcohol metabolism, affecting your risk of increased alcohol consumption and alcohol use disorders.

- You have **typical variants** of all of these genes, meaning that you likely metabolize alcohol rapidly and effectively, which is protective against alcohol dependence and alcohol use disorders.
- Keep in mind that although you may not have any issues related to how you metabolize alcohol, you should still be alert to the various potentially negative impacts that alcohol use can have on your health including its effect on testosterone and triglyceride levels, as well as liver damage and your ability for detoxification.

Sodium

Sodium, the most common source of which is table salt, is an essential mineral in the human body. It helps to regulate fluid balance within our body and cells, and is used by the body for transmission of signals within the nervous system as well as for heart and other muscular contraction. Too much sodium can cause a number of adverse effects within the body, the most common of which is elevated blood pressure, or hypertension, which can predispose individuals to heart disease. People respond differently to sodium, with some individuals experiencing greater increases in blood pressure as a result of excess sodium consumption. Your DNA, specifically the ACE gene, is largely responsible for determining these fluctuations in blood pressure. Read on to find out which variant of ACE you possess and discover your sodium sensitivity.

Take Action:

• **Limit your sodium consumption** to Health Canada's Adequate Intake (AI) level of *1500mg/day* (ages 14-50), *1300mg/day* (ages 51-70), or *1200mg/day* (ages 71+) to help reduce your risk of high blood pressure (hypertension).

- 1500mg of sodium is equivalent to ¾ teaspoon of salt per day, which includes both sodium found naturally in food as well as salt added to food during processing and preparation.

- Be sure to always read packaged food labels and choose foods lowest in sodium, as packaged foods tend to be high in sodium.

Why?

According to your genetic test results, you may have an increased risk of elevated blood pressure when your sodium intake is high.

It's in your genes

The ACE gene encodes Angiotensin-Converting Enzyme, a central component of the renin-angiotensin system (RAS) which controls blood pressure by regulating the volume of fluids in the body.

• You have a variant of this gene that is associated with an **increase in sensitivity to sodium**, meaning you may be more likely to have larger blood pressure increases when your sodium intake is high.

My Results: Specific Nutrient Needs

Is visiting the health food store an overwhelming experience? There are so many nutrients - how are you supposed to keep track of them all and what do your genes say about how your body responds to them? In this section, we dive deeper into nutrition, looking at many of the nutrients, vitamins, and minerals that play major roles within your body. And armed with your genetic information, we help you create a diet and supplements plan tailored to your specific risk factors for nutritional deficiencies and enhanced nutrient needs.

Vitamin A

Vitamin A is a fat-soluble vitamin critical for eye health and vision, healthy skin, and immune function. Vitamin A exists in two major forms: active vitamin A (retinol), which can be found in high quantities in animal liver, and pro-vitamin A (most commonly beta-carotene), found in orange fruits and vegetables as well as green leafy vegetables. In order for the body to use pro-vitamin A, it must first be converted into retinol, which can then carry out its functions. The BCMO1 gene influences your ability to convert beta-carotene into retinol. Poor converters must rely on animal sources of vitamin A or vitamin A supplements to meet their recommended daily intake. Failure to consume adequate vitamin A can result in night blindness and other vision/eye problems. Read on to see what your genes say about your vitamin A conversion capacity and which sources of vitamin A are best for you.

Take Action:

• In order to meet your daily vitamin A requirements, **you will need to rely on animal sources of** Vitamin A in your diet such as poultry/beef liver, eel, tuna, herring, mackerel, and goat and cheddar cheese
  - check out your 'Lactose' section under 'Sensitivities' to see if you should limit lactose and/or consider lactose-free dairy products).
• Health Canada recommends a minimum of *900mcg* of RAE (retinol activity equivalents) daily for adult males and a minimum of *700mcg* of RAE daily for adult females.
  - Pregnant females should consume a minimum of *770mcg* of RAE daily and breastfeeding females should consume a minimum of *1300mcg* of RAE daily.
• You may choose to take a daily supplement including active Vitamin A at the minimum levels listed above.
  - Make sure that you are supplementing with no more than *3000mcg* RAE daily.

Why?

According to your DNA test results, you may be unable to effectively convert beta carotene to vitamin A, meaning that you need to rely on animal sources of vitamin A or vitamin A supplements to meet your recommended daily intake.

It's in your genes

• The BCMO1 gene is involved in the conversion of plant-sourced beta carotene into retinol, one of the active forms of vitamin A which is responsible for vision.
  - You have a variant in this gene that is associated with **reduced ability to convert beta carotene into active vitamin A**.

Vitamin B12, Folic Acid, Vitamin B2

Vitamin B2, B12, and folic acid (vitamin B9) are all molecules and cofactors that, in a series of complicated molecular pathways, are involved in the conversion of homocysteine to methionine within the body. Improper homocysteine metabolism can lead to a buildup of homocysteine which can result in a number of adverse health effects. In this section, we look at genes associated with B12 deficiency, as well as genes involved in metabolizing homocysteine and folate, and genes that shed light on what form of vitamin B12 you should consume. Read on to learn about your genetic variants, and what they mean in combination for your required intakes of vitamin B12, B2, and folic acid.

Take Action:

• See your healthcare practitioner to **test your homocysteine levels.**
• **Supplement with *480 mcg* of 5-methylfolate** (L-5-MTHF) daily, an active version of folic acid, and avoid inactive folic acid supplements.
- Be sure to also **consume** folate rich food sources in your diet including dark leafy greens, spinach, asparagus, legumes (lentils, chickpeas, lima beans, black beans, kidney beans, pinto beans, green peas), Brussels sprouts, avocados, and broccoli.
• **Supplement with *1000 mcg* of vitamin B12** daily sourced from *methylcobalamin*. It is best for you to take this sublingually (under the tongue).
- If you find that the methylcobalamin form of vitamin B12 is too stimulating for you, switch to using the hydroxycobalamin form of vitamin B12.
• **Consume adequate** vitamin B2 (riboflavin) daily. Health Canada recommends that males consume *1.3 mg/day* and females consume *1.1 mg/day*.
- If you are unable to meet this requirement from diet alone, ensure that you are supplementing with vitamin B2, either alone or as part of a multi-vitamin/mineral complex.

Why?

According to your DNA test results, you carry gene variants associated with a decrease in MTHFR activity when folic acid intake is low.
• This can lead to reduced conversion of methylfolate to tetrahydrobiopterin (BH4), an important cofactor in nitric oxide and neurotransmitter biosynthesis as well as in homocysteine detoxification.
- This can ultimately put you at risk of having unhealthily elevated homocysteine levels, which has been implicated in various cardiovascular disorders, as well as putting you at risk of mood disturbances.
• You also carry genetic variants associated with increased vitamin B12 needs, meaning that you should supplement with vitamin B12 to prevent deficiency and to prevent excess homocysteine accumulation.

It's in your genes

• The MTHFR, MTRR, and MTR genes encode enzymes that use vitamins B2, B9 (folate), and B12 for the conversion of homocysteine into methionine, an amino acid required in the form of S-adenosylmethionine (SAMe) for the function of hundreds of processes in the body.
- Due to a genetic variant within at least one of these 3 genes, you are at **risk of having reduced MTHFR activity**, meaning that your homocysteine conversion is likely to be inefficient and your mood balance may be affected.
- MTHFR is an enzyme responsible for activating dietary folate into methylfolate (L-MTHF).
• The FUT2 and COMT genes are involved in determining both your risk of vitamin B12 deficiency, as well as which form of vitamin B12 you should be consuming.
- You carry the 'typical' or 'normal' version of the FUT2 gene, which affects vitamin B12 absorption. However, you carry a version of the MTR and/or MTRR gene that is associated with **reduced vitamin B12 recycling**, and thus you still may have **higher than typical needs for vitamin B12** to prevent deficiency and to prevent excess homocysteine.
- Due to a genetic variant you carry in the COMT gene, **you may find taking methylcobalamin too stimulating**.
- If this is the case, you should switch to using the **hydroxycobalamin** form.

Vitamin C

Vitamin C, or ascorbic acid, is a water-soluble vitamin that plays many important roles within our bodies. As an antioxidant, vitamin C helps to protect our cells and DNA against the damaging effects of free radicals. Vitamin C is also essential for the synthesis of collagen, the major component of all of our connective tissues which makes up the majority of our skin, tendons and ligaments, blood vessels, bones, teeth, and cartilage. Great sources of vitamin C include several fruits and vegetables, especially bell peppers, citrus fruits, and guava. Variants in the GSTT1 gene have been shown to affect vitamin C processing, putting certain individuals at increased risk of vitamin C deficiency. Read on to find out what your genes say about how your body processes Vitamin C and learn about your recommended intake.

Recommendation:

There are no specific recommendations for you as you have the typical version of this gene, meaning you are **likely not at heightened risk for vitamin C deficiency**.

• For your best health, you are still recommended to **meet your daily** Vitamin C **intake**. Health Canada recommends that adult males consume *90mg* daily and that adult females consume *75mg* daily.
  - Pregnant females should consume *85mg* daily and breastfeeding females should consume *120mg* daily.
  - Smokers should consume *35mg more* than their daily recommended intake to combat additional oxidative stress.

Why?

According to your DNA test results, you are likely to have normal blood vitamin C levels with adequate vitamin C intake.

It's in your genes

• The GSTT1 gene is involved in detoxification and combating oxidative stress.
  - You have the **'typical'** or **'normal'** version of this gene which is associated with a normal ability to combat oxidative stress and adequate levels of vitamin C in your blood.

Vitamin D & Calcium

Vitamin D, a fat soluble vitamin, and calcium, the most abundant mineral in the body, are a pair of molecules that work together to help maintain our bone mineral density. Vitamin D, which can be synthesized by the skin upon exposure to sunlight or consumed in specifically enriched foods, promotes intestinal calcium and phosphate absorption, as well as regulating bone maintenance and remodelling. Calcium, primarily found in milk and other dairy products, is essential for muscle contraction, nerve transmission, and cell signalling. It is also the primary mineral component of bone, comprising 50% of their volume. Several genes are involved in the transport and activation of of vitamin D, as well as the overall maintenance of bone mineral density, with both having implications for your dietary intakes of vitamin D and calcium. Read on to discover what your genes say about how your body handles vitamin D and what this means for your recommended intake of both vitamin D and calcium.

Take Action:

• Be sure to **supplement with *1000 IU* of cholecalciferol vitamin D daily**.
• Have your healthcare practitioner **test your serum vitamin D levels** as you may require supplementation with higher levels of vitamin D.
• You are **likely not at an increased risk of low bone mineral density** with adequate dietary calcium and vitamin D, but for your best health, you are still recommended to **try to meet Health Canada's** calcium **recommendations**.
- Health Canada recommends that males under 70 and females under 50 consume *1000mg/day* and that males over 70 and females over 50 consume *1200mg/day*.

Why?

According to your DNA test results, your body may be less effective at converting vitamin D into its active form and transporting it throughout the body, meaning that you may have a higher risk of vitamin D deficiency, even with adequate sunlight exposure.
• It is thus crucial that you consume your daily recommended intake of vitamin D to avoid the health complications associated with vitamin D deficiency
• You also likely have a lower risk of lower bone mineral density when you consume adequate calcium and vitamin D in your diet.

It's in your genes

• The CYP2R1 gene produces Vitamin D Hydroxylase, an enzyme that converts vitamin D to its active form, 25-hydroxyvitamin D, in the liver. The GC gene produces a protein that helps maintain vitamin D levels within the blood.
- You carry a genetic variant in at least one of these genes, meaning that you **may have issues converting vitamin D into its active form**, and as a result, your **vitamin D levels may be lower than normal**.
• The VDR gene provides instructions for making the Vitamin D Receptor, a protein which helps to regulate many functions in the body including bone formation.
- You have the **'typical'** variant of this gene, meaning that you will likely have proper maintenance of bone density .

Vitamin E

Vitamin E is a fat-soluble vitamin found in plant oils from vegetables, nuts, and seeds, required for the proper functioning of many organs. It plays a vital role in our immune system as an antioxidant, helping to eliminate free-radicals, and it helps to prevent the formation of blood clots. Vitamin E deficiency is characterized by peripheral neuropathy (difficulty conducting nerve impulses from the brain to the rest of the body), ataxia, skeletal myopathy, damage to the retina (possibly leading to vision loss), and impairment of the immune response. As some people are at an increased risk of blood clots as a result of variants in their F5 gene, it is recommended that these individuals consume greater quantities of vitamin E. Read on to discover what your genes say about your risk of blood clotting disorders, as well as your recommended intake of vitamin E.

Recommendation:

There are no gene-specific recommendations for you as you have the typical version of this gene which **does not put you at risk** of having increased vitamin E needs.

• For your best health, however, Health Canada recommends that you **consume *15mg* of** Vitamin E daily.

Why?

According to your DNA test, you likely have a normal/low risk of blood clotting disorders.

• Vitamin E acts as a blood thinner and can help to manage blood clotting disorders, when present.

It's in your genes

• The F5 gene encodes coagulation factor V, a protein which works with other coagulation factors to form blood clots in response to any form of blood vessel damage is involved in the body's blood clotting system.

- You have the **'typical'** or **'normal'** version of this gene, meaning that you likely do not have an elevated risk for blood clotting disorders.

Iron

Found primarily in liver and red meat, iron is an incredibly important chemical element within the human body. Most importantly, iron is found at the core of hemoglobin, the primary component of red blood cells, and is essential for oxygen transport throughout the bloodstream to the lungs and tissues. It is also found at the core of our cytochrome P450 enzymes, a broad group of enzymes within our body responsible for drug metabolism, steroid hormone synthesis, and fatty acid metabolism. Iron balance within the body is extremely important. Too little iron can result in iron-deficiency anemia, characterized by extreme fatigue, weakness, chest pain, shortness of breath and poor appetite; too much iron (iron overload) can result in joint pain, abdominal pain, irregular heart rhythm, skin colour changes (bronze, grey, green), and other health complications. Certain genetic variants increase your risk of iron deficiency and others can put you at greater risk of iron overload. Read on to discover what your DNA says about the way your body handles iron, and whether more or less iron consumption is right for you.

Take Action:

Ensure that you are getting enough iron in your diet.

• Health Canada recommends that males (19+) and females (51+) should consume 8mg of iron daily, and females between 19-50 should consume 15mg of iron daily.

• If you are unable to meet this iron level via your diet, consider taking an iron supplement. Take this along with Vitamin C for enhanced absorption.

Why?

According to your DNA test results, your ability to transport iron to your tissues may be reduced, which can put you at an increased risk for developing iron deficiency anemia.

• It is thus critical that you are consuming your daily recommended intake of iron.

It's in your genes

• There are several genes involved in iron balance within the body, all of whom interact in some way to detect and regulate the levels of iron absorbed and transported throughout the body.

• Together, the TF, TFR2, TMPRSS6, and HFE genes help to ensure that your iron balance is in check.

- You have an **'atypical'** version of at least one of the three genes involved in determining your risk of iron deficiency (TMPRSS6, TFR2, and/or TF), meaning that your iron transport to tissues may be reduced.
  - This may put you at **risk for iron deficiency anemia**.
- You have the **'typical'** or **'normal'** version of the HFE gene, the gene involved in determining your risk of iron overload (hemochromatosis), meaning that you likely have normal levels of transferrin, a protein that limits the amount of free iron within the body.

Antioxidants

Your body is constantly encountering free-radicals, chemicals that are capable of damaging your cells and your DNA, either as byproducts of your body breaking down food or from environmental sources (ex. radiation, tobacco smoke). In large enough quantities, these free radicals generate oxidative stress that is capable of contributing to chronic diseases such as cancer, heart disease, and neurodegenerative diseases. Antioxidants, such as vitamins A, C, E, and selenium, are substances that combat oxidative stress, protecting your cells from the harmful effects of cell-damaging free radicals. When antioxidant intake is low, it can result in fatigue, poor memory, skin and hair changes, and impaired wound healing. Read on to discover what your genes say about your body's natural ability to quench free radicals as well as your antioxidant requirements.

Take Action:

It is recommended that you **increase your antioxidant intake by doing the following**:

- Add lots of dark-coloured fruits and vegetables to your diet such as purple, red and blue grapes, blueberries, red berries, dark green vegetables such as kale and collard greens, and orange vegetables such as carrots and sweet potatoes.
- Taking an antioxidant supplement including vitamins A, C, E, and selenium is also recommended.
- ALA (alpha-lipoic acid), L-carnitine, CoQ10, and manganese (as part of a mineral supplement) may also be considered.
- Curcumin and grape seed extract supplements have also been found to increase SOD2 levels.

Why?

According to your DNA test results, you may have a reduced ability to clear free radicals from your body, which may put you at risk of higher oxidative stress leading to cell damage.

- It is thus extremely important to consume lots of antioxidant-rich foods in your diet.

It's in your genes

The SOD2 gene encodes the SOD2 enzyme, which helps to eliminate free radicals and reduce oxidative stress within your cells.

- You have a genetic variant that is associated with **lower enzyme activity**, which may reduce your ability to clear free radicals, and may put you at risk of greater than normal oxidative stress and cellular damage.

Omega-3 Fatty Acids

Omega-3 fatty acids are 'good' types of fat that are important for lowering unhealthy blood fat (triglyceride) levels and for decreasing inflammation. Symptoms of omega-3 deficiency include dry skin and hair, attention and concentration problems, irritability and mood swings, fatigue, and joint discomfort. There are three types of omega-3s: ALA (found in plants such as nuts, seeds, and plant oils), and EPA and DHA (both of which are found most commonly in the oils of fish such as salmon, trout, cod, and herring). Most dietary ALA is converted into EPA/DHA. Your body's ability to convert ALA to EPA/DHA is largely genetically determined, and impacts which sources and types of omega-3s you should be consuming. Read on to learn what your genes say about how your body handles omega-3, and which sources are best for you.

Take Action:

Ensure that you are consuming enough omega-3 fatty acids in your diet.

• Sufficient omega-3 fatty acids can be obtained by consuming at least two *2.5 oz*. servings of fish weekly, which provides an average of *0.3-0.45g* of EPA/DHA per day

- You can also choose to take a daily fish oil supplement that provides at least *1000mg* of omega-3 fatty acids and at least *100mg* of EPA (eicosapentaenoic acid) + DHA (docosahexaenoic acid) .

• You can also consume plant-based sources of omega-3 fatty acids that contain alpha-linolenic acid (ALA), including chia seeds and flaxseeds.

- Dietitians of Canada recommends that males consume a minimum of *1.6g* of ALA daily and females consume a minimum of *1.1g* of ALA daily .

- To meet this requirement, you can also choose to take a daily flaxseed oil supplement to provide you with your required ALA.

Why?

According to your DNA test results, you may have a higher risk of metabolic syndrome when your omega-3 fatty acid intake is low, so it is especially important for you to consume adequate omega-3 fatty acids in your diet.

• You are, however, likely efficient at converting ALA (plant-based omega-3 fatty acids) to EPA/DHA (animal-based omega-3 fatty acids), meaning that it does not matter which omega-3 sources you consume.

It's in your genes

• The FADS2 gene encodes a portion of the D6D enzyme which converts between different types of fatty acids, including the conversion of ALA into EPA/DHA.

- You have a **'typical'** version of this gene, meaning that you are **likely able to efficiently convert dietary ALA into EPA/DHA** and can thus consume either plant-based sources or animal-based sources of omega-3 fatty acids to meet your daily omega-3 requirement.

• The IL6 gene encodes interleukin-6, a protein involved in the generation of inflammation within the body during immune responses. Variants in IL-6 are also associated with increased risk of certain metabolism-related disorders, specifically obesity and metabolic syndrome, in response to omega-3 fatty acid intake

- You carry a genetic variant that is associated with an **increased risk of metabolic syndrome** when you don't consume adequate omega-3 fatty acids.

Choline

Choline is an important vitamin-like nutrient found in eggs, seafood, meat, poultry, soy, peanuts, cruciferous vegetables, and some dairy products. Phosphatidylcholine, made from choline, is a lipid found in the membrane of each of our cells, and is necessary for cell structure and signalling. Choline itself can also be converted into acetylcholine, one of the primary neurotransmitters in our central nervous system, and is thus important for neurotransmission. Choline has also been linked to reducing the risk of fetal neural tube defects and fatty liver disease. As an essential nutrient, it cannot be synthesized by the body, and thus must be consumed in your diet. And though deficiency is rare, certain genetic variants can put you at increased risk of choline deficiency, which is characterized by low energy levels, memory loss, cognitive decline, muscle aches, and mood changes or disorders. Read on to learn what your genes say about your risk of choline deficiency and how much you should be consuming daily.

Take Action:

Ensure that you meet your adequate intake for choline as choline is a key component of phosphatidylcholine.

- Adult males should consume at least *550mg daily* and adult females should consume at least *425mg daily*.
- Consider taking a phosphatidylcholine supplement, unless you are on cholinergic or anticholinergic drugs.

Why?

According to your DNA test results, you may be at risk of having reduced phosphatidylcholine levels.

- Phosphatidylcholine is a key component of all cell membranes, and thus affects all biological functions.
- It is also a precursor for the neurotransmitter acetylcholine, which plays a role in memory and other brain functions.
- Decreased phosphatidylcholine can also lead to fatty liver, as it is essential for fat removal from the liver.

It's in your genes

The PEMT gene encodes the PEMT enzyme which is responsible for the conversion of phosphatidylethanolamine, another membrane lipid, into phosphatidylcholine within the liver.

The FADS1 gene encodes the FADS1 enzyme which helps to convert between different forms of unsaturated fatty acids, which are found alongside phosphatidylcholine within our cell membranes.

- You carry genetic variants which have been associated with having **lower than normal phosphatidylcholine levels**.

Probiotics

Did you know that we have more bacterial cells in our bodies than human cells?! Probiotics are living microorganisms that are very similar to ones already found in our bodies, and found in several foods and supplements including yogurt (with live cultures), tempeh, and kimchi. As living organisms, they play an important role in immune system function and in creating a healthy bacterial balance in the body, particularly in the gastrointestinal tract. Studies have linked probiotic consumption to therapeutic benefits for irritable bowel syndrome, as well as other gastrointestinal conditions. When probiotic intake is low and gut microflora are out of balance, it can result in constipation, gas, chronic diarrhea and chronic bad breath. Certain genetic variants have been linked with lower concentrations of specific gastrointestinal probiotics, which can affect your overall digestive health. Read on to learn how your genes influence your levels of gut microflora and whether or not you may need probiotic supplementation.

Take Action:

Supplement with bifidobacterium bacteria as well as the prebiotic (gut bacteria food) **2'-fucosyllactose** to ensure optimal gut health.

Why?

According to your DNA test results, you may be at risk of having lower concentrations of the gut microbe, bifidobacterium.

- Normal levels of microflora within your gut are important for immune and digestive health.

It's in your genes

The FUT2 gene helps to influence the composition of bacteria that live within your gut. Variants in this gene may affect various microorganisms and their relative quantities within your gut.

- You carry a genetic variant that **may negatively affect the levels of your gut microflora**.

My Results: Physical Fitness

It goes without saying: Exercise is good for you. It promotes strength, endurance, and flexibility, and can also help to reduce body fat and boost metabolism. There are many types of exercises, including endurance activities (such as cycling and running) and power exercises (like lifting weights). In this section, we take a thorough look at the exercise regimen best suited for your unique genetic makeup as well as how your genes influence your susceptibility to injury, how quickly you are able to recover after a workout, the impact of exercise on managing Type 2 Diabetes, your pain tolerance, your inherent inclination towards exercise, and your bone health profile.

Pain Tolerance

We all experience pain; it is an emotional and sensory experience in response to intense or damaging stimuli. While we all have the same nerves that signal pain, not everybody experiences the same sensation of pain, even in identical situations. Differences in pain tolerances (how much pain we can take), and pain thresholds (when we begin to feel pain), impact our overall experiences with pain. And of course, our genetics help to modulate our individual responses to pain. Read on to learn what your genes say about how you are likely to experience pain.

Recommendation:
There are no gene-specific recommendations for you as you carry a version of this gene which is commonly found in people having a **higher than typical pain tolerance**.

Why?
According to your test results, you may have an enhanced pain tolerance, meaning that you experience less pain when exercising and thus are likely to be able to exercise harder and longer.

It's in your genes
The COMT gene is involved in pathways that process pain signals.
• You have a version of this gene that is associated with higher pain tolerance, which may make you experience **less pain when exercising**.

Exercise Motivation

Do you have an itch to lace up and go for a run? Or do you just want to lay back with your feet up and read a book? While both of these are great uses of your time, believe it or not, your genetics may actually be influencing your decision to get up and be active... or not. Some individuals actually have a natural inclination to want to exercise, getting more pleasure following exercise and perceiving exercise as requiring less effort. Finding out your natural exercise motivation tendencies allows you to design an exercise plan that will work with, rather than against, your intrinsic motivations. Read on to learn what your genes say about your exercise motivation, and what you can do to make sure you're motivated to get up and get active!

Take Action:

• In order to ensure that you are being active regularly, accountability goes a long way! Some strategies that you can consider are:
  - Working out with a friend
  - Committing to a regular exercise class
  - Working with a personal trainer
  - Joining an online fitness community
  - Using an activity tracker such as a Fitbit®
  - Sharing your results with family, colleagues and friends
• Try to get in at least 20-30 minutes per day of **moderate to high intensity cardiovascular exercise** (walking, running, spinning, swimming, etc.) and add in a resistance training session (eg. Weights, yoga, bands, etc.) 1-3 times per week.

Why?

According to your genetic test results, you may be less motivated to exercise, meaning that you may require strategies to ensure that you are exercising regularly.

It's in your genes

• The BDNF gene produces a protein that works in the brain to influence muscles, blood vessels, and the nervous system, ultimately influencing your response to exercise.
• The LEPR gene produces a protein called the leptin receptor, which is involved in the regulation of body weight and energy balance, and also impacts your motivation to exercise.
  - Your genetic variants may make you **less likely to want to exercise**, so you will need to put in some extra effort to ensure that you are staying physically active.

Endurance vs. Power

Endurance activities, including long-distance cycling and running, are activities that require muscles to generate force consistently for long periods of time. Conversely, power activities, including sprinting, jumping and powerlifting, involves generating lots of force quickly. Endurance and power activities rely on a number of factors which are influenced by your genetics, including the dominant types of muscle fibres you possess (fast-twitch vs. slow twitch), as well as your cardiovascular efficiency. So are you more suited to endurance exercises, or are you more of a power athlete? Read on to learn what your genes say about the type of activities you are more likely to be adept at.

Recommendation:

Incorporate both endurance and power exercises into your exercise regimen.

• Endurance exercise includes activities that increase your breathing and heart rate, such as low intensity resistance training, walking, jogging, swimming, and biking.

• Power exercise includes high intensity resistance training such as strength training exercises (eg. weights) being done at a faster speed to generate force more quickly.

Why?

According to your genetic results, you don't have a predisposition to either power or endurance exercise exclusively.

It's in your genes

• ACTN3 is a gene involved with the production of a protein that is only found in fast-twitch muscle fibres, the fibres that you use for short bursts of intense activity.

• ACE is a gene involved with the regulation of blood pressure and it plays an important role in cardiorespiratory efficiency.

- Your genetic variants in these two genes are associated with both **power and endurance exercise**.

Exercise Recovery

Physical activity, from weight-lifting to running, causes "good damage" to muscle fibers. A period of rest between exercise sessions is recommended for your muscles to keep on burning and to be able to properly strengthen and rebuild. The question is, what is your body's optimal recovery time for cardio and strength training exercises? Everyone is different, and your genetics have a large part to play in post-exercise inflammation and fatigue. Determining how long it takes for your body to recuperate is key to preventing injury and building an exercise regimen that is optimal for you. Read on to learn about what your genes say about how much rest you should be getting following exercise.

Take Action:

- It is essential that you **get adequate rest following exercise**.
- You are also encouraged to **consume omega-3 fatty acids**, either via your diet or by taking a fish oil supplement, to improve exercise recovery.
  - In the '*Specific Nutrient Needs*' section, check your ability to convert plant based omega-3 fatty acids (ALA) to active EPA and DHA before deciding on the best omega-3 sources for you.
- If you take part in vigorous or high intensity exercise (which can induce oxidative stress via free radical production), consider consuming curcumin and/or NAC (N-acetylcysteine) to help clean up free radicals with limited disruption of your oxidant/antioxidant balance.

Why?

According to your test results, you are more likely to experience inflammation and fatigue following exercise.

- Rest and consumption of omega-3 fatty acids can both be used to help reduce inflammation and support adequate muscle recovery.

It's in your genes

- The IL6, IL6-R, CRP, TNFa, and SOD2 genes are all involved in some aspect of your body's immune response and ultimately, the generation of inflammation. Collectively, they help to influence your body's level of muscular fatigue and inflammation following exercise.
  - You have genetic variants that place you in the **highest risk category for muscle damage, fatigue, and inflammation following exercise**.
    - This means that you likely need more time to recuperate before you can train again.
  - You also have a variant in the SOD2 gene which which may be associated with a **decreased natural ability to clean up free radicals produced during high intensity exercise**.

Exercise Benefits for Type 2 Diabetes

Type 2 Diabetes, a disease characterized by high blood sugar and insulin resistance, is a disease largely governed by lifestyle choices. While cures for diabetes are non-existent, it can be treated and controlled to a large extent with lifestyle modifications, including eating well and exercising regularly. While everybody enjoys regular health benefits associated with exercise, some individuals possess genetic variants that may allow them to reap extra benefits from exercise, such as more effectively managing high blood sugar levels associated with Type 2 Diabetes. Read on to discover what your gene say about your ability to manage Type 2 Diabetes with exercise.

Recommendation:

There are no gene-specific recommendations for you as you have the typical version of this gene.

• You will, however, still benefit from regular exercise and, in doing so, may reduce your risk of developing diabetes.

Why?

You have typical responsiveness to the beneficial health effects of exercise associated with type 2 diabetes. Most people benefit from exercise, but are less able to use it as a tool to manage type 2 diabetes.

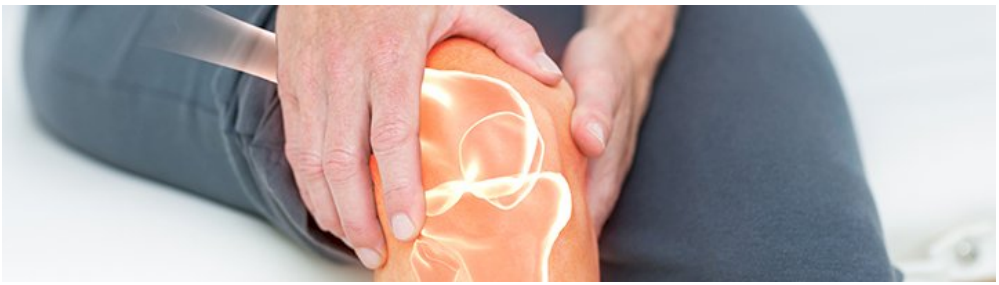
It's in your genes

The PPARG2 gene encodes a receptor expressed in the nucleus of most fat tissue cells. It is involved in the regulation of fatty acid storage and glucose metabolism.

• Studies have shown that for individuals with your version of the gene, **exercise doesn't have a greater than normal impact on managing type 2 diabetes**.

Bone Health

Bones are literally the skeleton of our bodies, providing structure and support for our nervous system, blood vessels, organs, and muscles. They are constantly being built up and broken down in a process called remodelling, which is vital to keeping bones strong and healthy. Various types of exercise, including balance training, weight bearing aerobic activity, and strength training, are important to ensure that bone remodelling is occurring properly, and to help prevent major falls which can further damage your bones. In this section, we look at two genes that influence your bone health, which includes your bones' strength (resistance to fracture), mineral density, structure, and quality. Read on to learn about what your genes say about your predisposition to bone loss and how you should exercise to optimize the health of your bones!



Take Action:

In order to protect your bones, Osteoporosis Canada recommends that you participate in an exercise program that incorporates various elements:

• **Strength training** at least 2 days/week using free weights, machines, bands, or body weight for resistance. Two sets of 8-12 repetitions per exercise.
  - Include all major muscle groups: biceps and triceps (arms), deltoids (shoulders), pectoralis major (chest), latissimus dorsi (back), hamstrings, quadriceps, and glutes (major leg muscles), and abdominals (core).
• **Balance training** every day (approximately 15-20 minutes daily), totalling at least 120 minutes/week (eg. tai chi, dancing).
• **Weight bearing aerobic physical activity** most days of the week (walking, dancing, jogging, stair climbing, step aerobics, and running) for 20-30 minutes/day for at least 10 minutes per session.
• **Posture training** every day to strengthen your back muscles.

Why?

According to your DNA test results, you may be more prone to bone loss, meaning that you should be performing some form of exercise daily.

• Exercise is an important step towards preserving your bone health as it helps to protect your spine, slows the rate of bone loss, and builds muscle strength which can prevent falls.

It's in your genes

• The VDR gene provides instructions for making the Vitamin D receptor, a protein which helps to regulate many functions in the body including bone formation.
• The IL6 gene encodes interleukin-6, a protein involved in the generation of inflammation within the body during immune responses. This gene also impacts your bone homeostasis and rate of bone resorption.
  - You have a variant in at least one of these genes which has been associated with being **more prone to bone loss and a higher risk of fracture**.

Injury Risk

While exercise has a multitude of benefits, there is always a risk of injury if not done properly or safely. Thankfully, there are many steps you can take towards preventing injury, including warming up your muscles, stretching before and after exercise, and improving overall strength and flexibility. Based on genetics, not every individual is equally susceptible to injury, with some having a naturally higher risk of exercise-related injury. Are you at increased risk of an exercise-related injury? Read on to learn about what your genes say about your vulnerability to injury and specific steps you can take to protect yourself from getting hurt.

Take Action:

- Take caution to prevent general injury by ensuring that you **stretch muscles prior to and following exercise**.
- As well, **stretch your lower leg muscles** one to three times per day for 15-30 seconds per stretch to protect yourself from achilles tendon injury.
  - You can further protect your achilles tendon from injury by specifically strengthening your calf muscles, performing standing and seated calf raises to work the calf muscle differently.
- Ensure that your exercise footwear fits well and has sufficient support to protect you from injury.
  - Consider being fitted for orthotics in your shoes to ensure that your gait is optimal while you are exercising.
- Appropriate training will also help to prevent injury.
  - Begin with shorter, easier workouts and progress as you get stronger and more aerobically fit.

Why?

According to your DNA test results, you may be at a higher risk of achilles tendon and other general injuries related to exercise.

It's in your genes

The COL5A1 gene is involved in the production of a type of fibrillar collagen found in many tissues within your body.

- You carry a version of this gene that is associated with a **higher risk of exercise-related injury**, especially of the achilles tendon.

Exercise Preference

As with nutrition, exercise is definitely not one-size-fits-all. Thankfully, there are lots (and lots) of different activities you can do to stay in shape, build muscle, or just feel good. Some may love going for an "easy" fast 10K run, while others may get the same enjoyment from some slow-paced city cycling. Your preference for more or less vigorous activity is partially influenced by your genetics. Are you likely to enjoy some fast-paced spinning, or does a walk around the block do it for you? Read on to learn what your genes say about your innate exercise preference, as well as activities that are best suited to you.

Recommendation:

You are likely to be happier with an exercise program that includes vigorous activities such as running, spinning, high intensity interval training (HIIT), intense swimming, power yoga, and pilates.

• Refer to your 'Exercise Recovery' section to see if it is recommended that you increase recovery time after vigorous or high intensity exercise.

Why?

According to your DNA test results, you may have an innate preference for more vigorous activity.

It's in your genes

NOS3 is involved in the production of nitric oxide, which helps your blood vessel walls to relax.

• You have a version of this gene that **increases the production of nitric oxide**. Individuals with this gene version have reported an increased **preference for vigorous exercise**.

My Results: Brain Health

Mental wellbeing is a key component of overall health, encompassing our emotional, psychological, and social states. The status of our mental wellbeing is affected by our life experiences, family history, socioeconomic condition, and biological factors such as brain chemistry and of course... genetics. Many genes play important roles in influencing various aspects of mental wellness. In this section, we specifically focus on four genes that collectively impact your mood, cognition, stress resilience, emotional states, and risk of substance addiction. Read on for some genetically-tailored recommendations to improve your overall mental wellbeing.

Predisposition to Addiction - Nicotine/Cocaine

Cocaine, a strong recreational stimulant, and nicotine, a stimulant found in cigarettes, are both substances with a high risk of dependence and abuse with regular use. There are several adverse health effects of both smoking cigarettes and cocaine, including altered psychological states, long-term respiratory disease and increased risk of developing cancer. While the best way to avoid addiction is to not start substance use in the first place, your genetics can also be a contributing factor to addiction vulnerability. Read on to learn about what your genes say about your risk of addiction.

Take Action:

• **If you smoke, quit! If you don't smoke, don't start!** Quitting smoking will allow you to reap the same health benefits as those without the risk allele, despite you being at increased risk for smoking addiction.
• Preventing teens (especially those under 16) from starting smoking is the best way to modify their genetic risk of nicotine addiction. Parent monitoring of those at higher genetic risk of addiction has been found to prevent addiction.

Why?

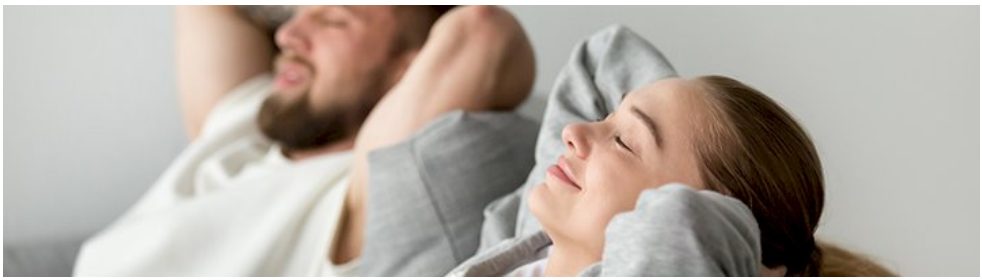
According to your DNA test results, you may be at risk of becoming addicted to nicotine as you are likely to have an enhanced pleasurable response to your first cigarette.
• You may also be less likely to become addicted to cocaine; however, you are still prone to the negative medical complications associated with cocaine use, including neurological, cardiovascular and gastrointestinal issues.

It's in your genes

The CHRN gene encodes the nicotine receptor, and you have a version of this gene that is associated with **enhanced pleasurable responses to your first cigarette and increased likelihood of nicotine addiction**.
• This gene variant has also been found to be protective against cocaine dependence.

Mood

Neurotransmitters are the chemical messengers of the nervous system, used to send messages within the brain and all over the body. Many of these neurotransmitters and their signals affect our physiological and psychological states, including our mood, (highly influenced by serotonin levels), stress response (influenced by levels of epinephrine and norepinephrine), and impulse control (affected by dopamine levels). The MAOA gene encodes an enzyme involved in the breakdown of all of these neurotransmitters, and is therefore important in helping to determine our mood balance and stress response. If MAOA levels are too high or too low, it can lead to mood disturbances which can be countered by certain dietary changes to alter MAOA activity. Read on to find out what your genes say about your levels of MAOA, how that might impact your mood balance, and what you can do to optimize your MAOA activity.



Take Action:

• **Ensure that you are getting enough** Vitamin B2 (Riboflavin) in your diet as MAOA uses vitamin B2 as a cofactor in order to function correctly.
- Females: *1.1mg/day*
- Males: *1.3mg/day*
- If you are unable to meet these requirements from diet alone, ensure that you are supplementing with vitamin B2, ideally as part of a B-Complex supplement product.

• **Improve your sleep habits**:
- Try to stick to a regular circadian rhythm: go to bed and wake up at the same time every day, block out light at night, keep your bedroom cool, get lots of sunlight during the day, don't use screens, exercise or eat right before bed, and have an early bedtime of around 10pm.
- Melatonin can be useful in improving your sleep habits.

• **Avoid MAO inhibitors** such as MAOI prescription medications, resveratrol, curcumin, methylene blue, quercetin, St. John's Wort, grapeseed extract, ginkgo biloba, licorice, coffee, and berberine.

Why?

According to your DNA test results, you have a version of the MAOA gene that is associated with lower than normal MAOA activity, meaning that you may have higher levels of serotonin, dopamine, epinephrine and norepinephrine, which can lead to having higher anxiety levels.
• Higher levels of neurotransmitters also make you more prone to aggression, violence and impulsive risk-taking, all of which can be exacerbated by early life stress.
• Enhancing your MAOA activity can help you maintain a proper neurotransmitter balance and reduce the likelihood of you having issues with anxiety, anger, and impulsiveness.

It's in your genes

MAOA is an enzyme that breaks down the neurotransmitters serotonin, dopamine, epinephrine, and norepinephrine. This function is very important to our mood balance and how we handle stress.
• You have a genetic variant that is associated with a **decrease in MAOA activity**, which may cause decreased breakdown of these neurotransmitters, leading to increased emotional arousal and more impulsive behaviour.

Memory

Your memory refers to your ability to store, retain, and remember information. Although seemingly simple, your memory is an extremely complex psychological processing system, with several working parts involved in encoding and recalling memories. There are also several types of memory, including short-term memory, which helps you recall recent experiences, and long-term memory, which allows you to remember that conversation you had a month, a year, or even a decade ago. Your genetics have a role to play in the strength of your memory consolidation and recall, as well as your attention span. Specifically, we focus on the DRD2 gene, which encodes a protein that regulates the action of dopamine within the brain, which ultimately affects your cognition. Read on to learn what your genes say about your memory and attention and what steps you can take to improving your memory.

Take Action:

• **Enhance your DRD2 activity** to improve your natural dopamine levels by **ensuring that you are consuming adequate zinc, folate, and vitamin B6 in your diet**.
- Zinc: *11mg/day* for males, *8mg/day* for females.
- Vitamin B6: *1.3mg/day* for males and females aged 19-50, *1.7mg/day* for males aged 51+, and *1.5mg/day* for females aged 51+.
- Consult your healthcare practitioner for more effective therapeutic doses.
- Folate: *400mcg/day* for all adult males and females.
- Check 'Vitamin B2/B12/Folic Acid' subcategory (in the 'Specific Nutrient Needs' section) to see if you should be taking activated folate as opposed to folic acid.
• Supplement with these if you are unable to consume adequate amounts in your diet.

Why?

According to your DNA test results, you carry a genetic variant associated with risk of having lower dopamine levels, which can result in reduced performance on tests of executive function and working memory.
• It is very important to meet your adequate intake of zinc, folate and vitamin B6 as they can all help to improve dopamine levels.

It's in your genes

The DRD2 gene regulates dopamine levels within the brain, which ultimately impacts cognition.
• You have a version of of this gene which is associated with **decreased levels of dopamine** in the brain, which can negatively affect cognition and memory.

Cognitive Performance and Stress Resilience

Stress is a normal part of everyday life. Regulated by the nervous system, it helps us respond to any form of external or internal stressor, including acute stress, trauma, and more chronic adversity, and can be healthy, even beneficial, in moderate amounts. However, when stress resilience is poor, it can interfere with both physical and mental wellbeing, including our cognitive performance. Our memory and cognition are important programs used by our brain to make decisions and process acquired information. Genetics play a role in altering both our ability to respond to stressful situations and our overall cognitive performance. Read on to find out what your genes say about your cognitive performance and stress resilience, and steps you can take to improve your overall mental performance.

Take Action:

• **Enhance COMT activity** in the following ways to improve your stress resilience:
- **Consume** foods high in magnesium such as buckwheat flour, oat bran, halibut, wheat flour and spinach. Magnesium supports healthy stress responses and may support relaxation through COMT-independent mechanisms.
- You can also **supplement with magnesium** in the glycinate or malate formats.
- If you are taking vitamin B12 supplements, choose those that are sourced from hydroxocobalamin instead of methylcobalamin as it tends to be less stimulating.

• **Avoid COMT inhibition** from consuming stimulants such as caffeine, being subjected to excess stress, having a high protein intake, and from taking green tea and/or quercetin supplements.

Why?

According to your DNA test results, you may be at risk of having higher than normal levels of the neurotransmitters epinephrine, norepinephrine, and dopamine, thereby enhancing your likelihood of being a **"worrier".**

• You may experience alertness, wakefulness, and occasional sleeplessness and restlessness.
• You may also have increased sensitivity to stimulants, and enhanced vulnerability to and difficulty relieving stress.
- Enhancing your COMT activity can help restore the balance of your neurotransmitters and mitigate many of the negative effects of being a "worrier."

• However, you also likely have enhanced working memory and cognitive function and are more likely to be efficient at processing information, especially in attention-related tasks, when you are not under stress.

It's in your genes

The COMT gene, often referred to as the "warrior/worrier" gene, encodes the COMT enzyme, which metabolizes and detoxifies dopamine, norepinephrine, epinephrine and estrogens.

• You have the **"worrier"** variant of this gene, which is associated with lower COMT activity meaning that less neurotransmitters and estrogen may be metabolized, leaving higher levels in your body.

Alzheimer's Disease Risk

The APOE gene encodes apolipoprotein E, which is essential for the proper transportation of cholesterol, and the growth, maintenance, and repair of neurons in the brain after injury. This protein binds cholesterol to form lipoproteins, which allows for cholesterol to be moved around the body and to be taken to the liver for breakdown. It also binds to LDL receptors to remove cholesterol from the blood. Variations in cholesterol metabolism are associated with many disorders associated with the cardiovascular system, such as heart attacks and strokes. In addition, due to APOE's function in neuronal repair, variations in APOE are implicated in brain health, particularly the risk for late-onset Alzheimer's disease (AD). Studies have shown that approximately 15-20% of Alzheimer cases are attributable to the APOE E4 allele; that the risk of AD increases and age of onset decreases with increasing number of E4 alleles (i.e., carriers of E4/E4 are at greater risk than E3/E4); and that the risk effect on AD decreases as patients age. Variations of the APOE gene affects cholesterol transport and thus accumulation within the blood to influence risk of high cholesterol. Read on to find out what your genes say about your ability to metabolize cholesterol, and use cholesterol for neurological repairs.

Recommendation:

Though there are no gene-specific recommendations according to your genotype in regards to the development of late-onset Alzheimer's Disease, fish oil supplements may be beneficial in reducing triglyceride levels in the body. General guidelines for maintaining cognitive health can be found through the Canadian Institute of Health Research.

Why?

Based on your test results, you are in the **low risk** category for insufficient APOE activity, which is otherwise associated with a decreased proficiency in binding LDL to form lipoproteins, accumulation of LDL in the bloodstream, and a decreased ability to transport cholesterol to sites of injury. Inside the brain, ApoE plays a role in breaking down amyloid beta (A) plaques, which are involved in the development of late-onset Alzheimer's disease. If you are experiencing symptoms such as memory loss, difficulty speaking or writing, difficulty completing familiar tasks, or trouble with understanding visual images and spatial relationships, it is recommended that you consult a physician.

It's in your genes

The APOE gene functions in the metabolism of cholesterol and the transport of cholesterol to sites of the body which need them for repair such as the brain. There are three common allelic variations of the APOE genes including E2, E3, and E4. The E2 allele is neuroprotective and reduces the levels of brain amyloid beta (A). This variation binds poorly to LDL receptors. The E3 variation is the most common, and expresses higher levels of antioxidative protective proteins. The E4 variation is the second most common variation worldwide and is associated with impaired ability to transport cholesterol effectively and break down amyloid-beta (A) peptides, which are associated with the development of late-onset Alzheimer's disease.

• You carry one copy each of the **E2** and **E3** variations, which is associated with optimal gene function in terms of Alzheimer's disease, but an elevated risk of developing familial hypercholesterolemia. According to your DNA test results, you have a **decreased risk of 0.62-fold for developing late-onset Alzheimer's disease**. Although this genotype is considered protective, there is an increased susceptibility to type III hyperlipoproteinemia with increased levels of triglycerides and remnant particles. It is important to note that increased risk does not guarantee that this disease will manifest but does increase the likelihood of this happening. Likewise, the absence of risk alleles does not exclude the possibility of disease. You may also have an increased risk of developing cardiovascular disease, but there are a number of other factors which contribute significantly to such illnesses.

My Results: Detox

Our bodies are constantly exposed to harmful toxins found in the foods we eat, in the air we breathe, and in the by-products of our own internal metabolic processes. Thankfully, our body also has lots of mechanisms in place to dispose of these toxins. In this section, we look at several of your body's detoxification pathways, and ask: how quick and effective are they at removing these toxins? Your genes play a key role in determining the efficiency of your detox pathways, and depending on your genetic variants, there are some minor nutritional and lifestyle adjustments that can make a major difference in helping your body achieve a healthy balance.

Sulfur Removal

Sulfur is an extremely important element in of all of our body's cells, found in the majority of the proteins in our body as a part of the amino acids methionine and cysteine. Sulfur and sulfur-containing amino acids are extensively metabolized within the body, producing a wide variety of compounds including the amino acid homocysteine, which is metabolized into either cysteine or methionine. In this section, we look at a gene involved in that conversion. Individuals with reduced conversion may have too much homocysteine and would be at risk of various health complications. Read on to learn what your genes say about the efficiency of your sulfur metabolism and steps you can take to stabilize your homocysteine levels.

Take Action:

- **Talk to your health care practitioner** about having your homocysteine level tested.
  - If you have higher than normal levels of homocysteine, it is recommended that you **supplement with *1800 mg* of NAC (N-Acetyl-L-Cysteine) daily** to help reduce your levels.
- **Ensure that you are getting enough** vitamins B2 and B6 in your diet or as part of a B-complex supplement.

Why?

You may have a reduced ability to metabolize sulfur, putting you at risk for higher homocysteine levels.

- Both NAC and vitamin B2 are associated with increased clearance of homocysteine from your blood.

It's in your genes

The CBS gene encodes an enzyme that helps with the conversion of homocysteine into cysteine, a key step in the sulfur metabolism pathway.

- You carry a genetic variant which is associated with lower levels of CBS in your body, which may result in less efficient sulfur metabolism. This may put you at risk of having higher levels of homocysteine that what is desirable for optimal health.

Glutathione Detox

Glutathione (GSH) is an antioxidant produced naturally in your liver and found in every cell in your body. It is also found in fruits, vegetables, and meat. GSH helps your body remove toxins by quenching reactive free radicals, and is involved in repairing and preventing damage to tissues and important cellular components. In this section, we look at genetic variants associated with your ability to remove toxins using GSH.

Take Action:

Be sure to include **cruciferous vegetables** (7g/kg body weight; e.g. broccoli, cauliflower, kale, brussels sprouts, and arugula) in your diet to support glutathione expression in a variety of tissues.

Why?

You may have a **reduced ability to remove toxins from your body using glutathione**, and thus should consume foods and natural products that support your production of glutathione.

• The key ingredients in cruciferous vegetables, sulforaphane and diindolylmethane (DIM), promote both GSTP1 expression and glutathione biosynthesis.

It's in your genes

The GPX1 gene encodes the glutathione peroxidase 1 protein, which is a member of the glutathione peroxidase family. This set of enzymes protect the cell from oxidative damage, by converting reactive oxidative species into hydrogen peroxide.

• You have the typical version of this gene and are thus likely to have **normal GPX1 activity**, which does not put you at an increased risk for oxidative damage.

GSTM1, GSTT1, and GSTP1 are all members of the GST (glutathione-S-transferase) family of enzymes involved in phase II detoxification, which increase the solubility of compounds for excretion from the body. Both the GSTM1 and GSTT1 genes are important in detoxifying common environmental carcinogens found in cigarette smoke, vehicle exhaust as well as fumigants. While a majority of the population carry two copies of every gene, deletions of GSTM1 and GSTT1 are relatively common, resulting in some individuals carrying fewer than two copies of these genes. Another member of the GST family is GSTP1, which plays an important role in cell function and detoxification.

• According to your DNA test results, you have **one copy of GSTM1** and **one copy of GSTT1**. Due to this, you likely have **reduced activity for both GSTM1 and GSTT1**. In addition, you are likely to have **normal GSTP1 activity**. Together, this may put you at an increased risk for diseases related to oxidative stress including cardiovascular disease and some cancers.

Note: there are additional environmental factors that contribute significantly to the development of diseases associated with abnormal GST and GPX enzymes. Work with your healthcare provider to understand your individual risk factors and to overcome these predispositions.

Ability to Remove Chemicals in Smoked and Charred Meats

There's something appealing about a nice, juicy piece of grilled meat. The flame gives it a nice flavour, and a little bit of a char gives it a smokey taste. Unfortunately, when we smoke and grill meats at high temperatures, we also generate toxic chemicals, namely heterocyclic amines (HCAs) and polycyclic aromatic hydrocarbons (PAHs). If these toxins are not cleared from our body quickly enough, they are capable of damaging our DNA, leading to longer term health issues. Our genetics influence how rapidly we are able to clear these toxins from our body, which ultimately determines our risk of health concerns from consuming smoked and charred meats. Read on to learn what your genes say about how your body processes these toxic chemicals and what it means for your meat consumption.

Take Action:

- **Limit your consumption of smoked and charred meats.**
- Dietitians of Canada recommends to *eat less than 500 grams of red meat each week* and to eat little, if any, processed meats such as deli meats, bacon or hot dogs to reduce your risk of cancer.
  - 500 grams of red meat is equivalent to approximately two 8 oz. steaks or four ¼ pound hamburgers.
- Also:
  - Avoid direct exposure of meat to an open flame or a hot metal surface and avoid prolonged cooking times (especially at high temperatures).
  - Continuously turn meat over on a high heat source.
  - Remove charred portions of meat and refrain from using gravy made from meat drippings.

Why?

You may be more likely to experience DNA damage and health issues from toxic compounds such as heterocyclic amines (HCAs) and polycyclic aromatic hydrocarbons (PAHs) that are produced by smoking and grilling meats.

- Reducing your consumption of smoked, charred, and deli meats can help you avoid excess toxic compounds and unnecessary DNA damage.

It's in your genes

The CYP1A2 gene encodes the CYP1A2 enzyme, a member of the cytochrome P450 family of enzymes involved in metabolism of drugs and other substances, including PAHs and HCAs.

- You have a genetic variant that makes you a **"medium metabolizer"**, meaning that you may clear out the toxic compounds found in smoked and grilled meats relatively slower than what is desirable.

Histamine Removal

Allergic responses are the result of your body's immune system reacting to harmless substances. During an allergic response, specific cells in your body produce and release histamines, molecules that are part of your body's natural defense system and are ultimately responsible for producing common allergy symptoms including itching, sneezing, inflammation, and anaphylaxis. Usually, two enzymes within your body, DAO and HNMT, metabolize histamines quickly, alleviating you of your annoying allergy symptoms. However, specific genetic variants cause underproduction of these enzymes, resulting in excess histamine within your body and ultimately, histamine intolerance, which is characterized by consistent allergic symptoms. Certain foods contain high levels of histamines, and avoidance of these foods can help with the treatment of histamine intolerance. Read on to learn what your genes say about how your body processes histamines and your risk of histamine intolerance.

Take Action:

• **Focus on foods that are** low in histamine, such as fresh meat, fish, fruits (except strawberries and citrus fruits) and vegetables (except tomatoes, spinach, avocado, and eggplant) among others.
• **Limit your consumption of** histamine rich foods**,** histamine releasing foods**, and** diamine oxidase (DAO) blocking foods.
- Remember that with histamine intolerance, the effects of histamine are cumulative so although it may be difficult to completely reduce your consumption of all of the foods listed, it is helpful to consume fewer histamine containing products at once.
- Grilling and frying foods has been found to increase histamine in food, whereas boiling has been found to have no effect, or to even possibly reduce the histamine content of food.
• Many people who have switched to a diet lower in histamines have found that they need to take less antihistamines.
- Several drugs also release histamine or inhibit DAO. Talk to your doctor if you are currently taking any of these medications.

Why?

According to your results, the histamine that is released when you are exposed to environmental allergens may not be broken down effectively, and thus you may be more likely to have a histamine intolerance and experience intense histamine reactions.
• This can be characterized by a variety of health concerns such as headaches, trouble sleeping, digestive distress, anxiety, flushing, congestion, sneezing, difficulty breathing, hives, fatigue, swelling, and chronic urticaria (skin rash with red, raised, itchy bumps).
Avoiding foods that are rich in histamine can help you to manage histamine intolerance and avoid intense reactions.

It's in your genes

The DAO and HNMT genes both encode enzymes responsible for the breakdown of histamine within your body.
• You have genetic variants in the HNMT gene associated with reduced function, meaning that you may have reduced ability to break histamines down effectively following exposure to environmental allergens.

My Results: Obesity Risk

Obesity is a disease characterized by excess body fat that may have negative effects on overall health, including increased risk of Type 2 Diabetes, hypertension, cardiovascular disease, cancer, and depression. While some cases of obesity are caused by poor lifestyle choices, many cases are caused by a complex combination of environmental and genetic elements. An analysis of your diet, lifestyle and DNA can help you recognize risk factors and take steps to put a personalized prevention and treatment strategy in place. In this section, we focus on several factors that impact your obesity risk, and provide recommendations on what you can start to do today to minimize your risk and optimize your health.

Preference for Dietary Fat

There is something tempting about a big plate of french fries, a bar of chocolate, or a handful of almonds; all foods high in dietary fat. Everybody has a different perception of fatty foods, which, in certain quantities, are necessary for our diets in order to absorb certain vitamins. However, It's important to balance fat intake in your diet, as fats are more caloric than either carbohydrates or proteins, and consumption in excess can cause various health complications. In this section, we look at a gene involved in the transport of fat into our cells. Certain variants of this gene are associated with the ability to perceive the taste of fats within food and the enjoyment of eating high-fat foods. Read on to find out what your genes say about your taste sensitivity to and preference for dietary fat, and whether you are at risk of consumption of excess fat.

Take Action:

Try to **stay within Health Canada's recommended daily fat intake** of *65g/day (30% of your daily caloric intake).*

Why?

According to your genetic test results, you are more likely to have the highest taste sensitivity to (and preference for) dietary fat, which can put you at risk for excess fat consumption, possibly leading to obesity.

It's in your genes

The CD36 gene is involved in fatty acid uptake from the blood into cells as well as fatty acid metabolism. It also affects your ability to perceive the taste of fats within the foods that you are eating.

• You have a version of this gene that is associated with being very **sensitive to the taste of fat and an increase in preference for consuming fats**.

Genetic Risk Score for Obesity

The development of obesity is an incredibly complex process, with environmental factors, lifestyle choices, and genetics all playing a major role. There are many, many genes that have direct and indirect effects on your obesity risk. Here, we analyze 14 genes involved in energy metabolism and obesity susceptibility to determine your unique overall Genetic Risk Score (GRS) for obesity. Your unique combination of variants in these 14 genes is a strong overall genetic predictor of your obesity risk. Read on to see your GRS results, learn about your susceptibility of becoming obese, and get tips on how best to avoid obesity.

Take Action:

- According to your genetic risk score, you may have a slightly elevated risk of obesity, and certain eating patterns will exacerbate this risk.
- To reduce your obesity risk, you are encouraged to reduce your overall caloric intake (including proteins, fats, and carbohydrates), as well as to reduce your consumption of fried food and sugar sweetened beverages.

Why?

Your genetic risk score for obesity puts you in the medium risk category.

It's in your genes

- As you possess a medium number of genetic risk variants for obesity, your obesity risk is more likely to be impacted by higher intake of calories, protein, fat, carbohydrates, fried food, and sugar sweetened beverages.

Eating Behaviour

Your body has a natural internal clock that regulates many of your conscious choices and unconscious physiological functions throughout the day. Among these many functions, your internal clock can have an impact on both your fat cells and how the timing of food consumption can impact your tendency to gain weight. Based on your genetics, the timing of your meals may have a stronger impact on your risk of gaining weight, as well as your ability to lose and keep off excess weight and fat. Based on your individual tendencies, you may also want to consider a supervised weight loss program. Read on to find out what your genes say about how much the timing of your meals matters, and how your eating schedule can impact your weight.

Recommendation:

There are no gene-specific recommendations for you based on your results for the PLIN1 and PER2 genes, as they don't point towards you being at increased risk of obesity as a result of the timing of your meals.

- You are encouraged to follow a healthy lifestyle including exercise and a balanced diet to prevent you from becoming overweight or obese
- The timing of your lunch is not likely to influence your ability to lose weight.

Why?

According to your DNA test results, you may be less likely to be overweight or obese, and weight loss intervention strategies are more likely to work effectively for you.

It's in your genes

The PLIN1 gene encodes PLIN, a protein that acts as a regulator of lipid storage within your body by coating lipid droplets until they are ready to be broken down.

The PER2 gene, a member of the Period family of genes, encodes the PER2 protein which helps to regulate your daily rhythm of activity, metabolism and behaviour.

- You have versions of these genes that are associated with a **low risk of being overweight or obese as a result of eating patterns**.
- Your weight loss efforts are also likely not negatively affected by the timing of your meals

Regulation of Appetite and Food Intake

Why is it that some people can constantly eat and still be hungry, while others get full on smaller meals? What leads some people to the fruits and veggies, and others to the chips and cookies? Many of our eating habits, including our overall appetite, satiety following eating, snacking patterns, and types of food we choose to eat have a genetic component. Your genes also play a role in determining your risk of obesity and Type 2 Diabetes in response to your eating habits. Knowing your genetic risk of certain diseases as a result of your dietary choices may help you become more aware of the food choices that you are making, as well as help you to alter your diet and routines accordingly. Read on to find out what your genes say about about your eating and what you can do today to reduce your risk of disease.

Take Action:

• **Following the** mediterranean **diet** will help decrease your risk of obesity and Type 2 Diabetes.
• Those who are physically active have been found to be less susceptible to FTO gene-related obesity so get moving!
- To reduce your risk of obesity, it is very important for you to get in at least 20-30 minutes per day of **moderate to high intensity cardiovascular exercise** (walking, running, spinning, swimming, etc.) and add in a **resistance training** session (weights, yoga, bands, etc.) 1-3 times per week.
• Additionally, you are advised to **limit your** saturated fat **intake** to under 15.5% of your daily calories (~34g/day, based on a 2000 calorie diet).
• Those with your genotype who are deficient in Vitamin D are at a greater risk of obesity so **ensure that you are getting adequate** Vitamin D daily.
- Health Canada recommends that adult males and females under 70 consume *600 IU* of vitamin D daily and that those over 70 consume *800 IU* daily .
- You may also choose to supplement with *1000 IU* of cholecalciferol vitamin D daily.
- **Talk to your health care practitioner about testing your serum vitamin D levels** as you may require supplementation with higher levels of vitamin D.

Why?

According to your genetic test results, you may have an increased risk of obesity as you may be more prone to having an increased appetite leading to poor eating habits such as excessive snacking, higher intake of overall calories, protein, and fat, and not feeling full after eating.
• You may also be more likely to have poor food choices and uncontrolled eating habits, leading you to consume more unhealthy foods. This can lead you to be overweight, as well as put you at a higher risk for Type 2 diabetes.
• Your obesity risk is exacerbated when you consume more saturated fats than polyunsaturated fats in your diet.
• You are also more likely to lose weight through diet and lifestyle modifications, but are also more susceptible to weight regain after discontinuation of a weight management program.

It's in your genes

The MC4R and FTO genes play an important role in the regulation of appetite and food intake, and can impact your ability to successfully lose weight and keep it off.
• Your genetic variants may put you at **increased risk of obesity**, especially when your saturated fat intake is high. FTO is the most significant gene in determining your obesity risk and it can impact your ability to successfully lose weight and keep it off.

My Results: Hormonal Health

Hormones, the body's "chemical messengers", are used to communicate between distant organs and tissues, and help to regulate a variety of functions within the body, including growth and development, metabolism, fertility, and mood. A number of key hormones need to be precisely balanced in order to ensure that your body operates with optimal efficiency. Certain genes involved in hormone synthesis and balance can reveal if you are predisposed to having suboptimal hormone levels, which can be detrimental for your health. In this section, we focus on some key hormones, look at the wide array of physiological functions that they govern, and summarize steps that you can take to ensure that your hormones are in the necessary equilibrium.

Thyroid Health

The thyroid gland, a small butterfly-shaped gland at the base of your throat, is one of the most powerful parts of your body, generating the thyroid hormones that are responsible for regulating most metabolic processes, from appetite and energy to internal temperature. Even minor imbalances in the gland's production of thyroid hormone can have a big influence on your health; and in most cases, fairly minor nutritional and lifestyle adjustments have the power to support your overall thyroid health and work towards restoring hormonal balance. Read on to find out what your genes say about your risk of an overactive or underactive thyroid gland and what steps you can take to mitigate your risks.

Recommendation:
There are no specific recommendations for you based on this gene, as you carry a version that is not associated with a higher than normal risk for reduced or overactive thyroid function.

Why?
According to your DNA results, you are likely to have typical levels of thyroid-stimulating hormone (TSH), which promotes normal/healthy thyroid function.

It's in your genes
You have gene variants that are associated with **healthy and normal TSH levels**. TSH regulates thyroid hormone release from the thyroid gland.
• Normal TSH levels indicate a properly functioning thyroid gland.

Testosterone

Testosterone is the primary male sex hormone, responsible for libido and secondary sex characteristics, as well as muscle mass and energy levels. Testosterone is also present in women, where it plays a role in the growth, maintenance, and repair of reproductive tissues, as well as in bone mass. The SHBG gene encodes a protein that influences the amount of "free" testosterone. Reduced amounts of free testosterone is associated with reduced libido, sexual dysfunction, infertility, reduced physical strength, weight gain, emotional changes, and changes in sleep patterns. Read on to find out if you are at risk of low testosterone and if so, how this can be remedied.

Take Action:

• **See your healthcare practitioner about having your testosterone levels tested**.
• Consider taking steps to ensure that your levels of testosterone are optimized, as you may experience lower testosterone levels. To boost testosterone levels, consider the following:
- Exercise including high intensity interval training (HIIT) and weight lifting.
- Eat a whole foods diet including balanced carbs, proteins and healthy fats. Undereating or overeating can decrease testosterone levels.
- Use stress management techniques such as exercise and deep breathing to reduce your stress levels. Consistently high stress can lower your testosterone.
- Try to get as much sleep as possible; 7-10 hours per night is ideal.
- Take supplements that have been proven to improve testosterone levels.
- Vitamin D3: *1000 IU* or more daily , as recommended by your health care practitioner.
- Zinc: up to **50mg** daily, or as recommended by your health care practitioner.
- Take herbs that have been proven to improve testosterone levels (including ginger and ashwagandha).
- Engage in a healthy sex life.
- Avoid estrogen-like chemicals such as those found in plastics (BPA, phthalates, parabens).
- Limit alcohol and drug use.
- Strive for lots of laughter, happiness and success!

Why?

According to your DNA results, you may experience decreased testosterone levels. Symptoms of low testosterone include:
• Change in sleep patterns
• Reduced sex drive (low libido)
• Sexual dysfunction
• Infertility
• Emotional changes
• Decreased strength
• Weight gain

It's in your genes

The SHBG gene encodes a protein produced in your liver that binds tightly to the hormones dihydrotestosterone (DHT) and testosterone and carries them throughout your blood.
• You have a version of this gene that is associated with **lower levels of free circulating, usable testosterone**.

Estrogen Detox (Glutathione)

Another aspect of Phase 2 Metabolism involves a family of enzymes called Glutathione-S Transferases, or GSTs. Similar to COMT, GSTs detoxify another harmful estrogen metabolite. GSTs function by conjugating/adding glutathione to either hydroxyl-estrogens or estrogen quinone, which makes it more soluble, and thus more easily excreted in the bile and urine. Accumulation of estrogen quinones have been linked with adverse health outcomes such as cellular and DNA damage. Genetic variants in your Phase 2 Metabolism genes can affect the rate at which your body clears out toxic estrogen metabolites and thus are important to consider when looking at estrogen levels and hormonal health. In addition, GSTs also play an important role in removing persistent organic pollutants (POPs) found in greenhouse gases and other commonly found chemicals such as pesticides, herbicides, heavy metals and polychlorinated biphenyls. These chemicals may interfere with hormone balance, and should therefore be considered when addressing hormonal health. Read on to learn what your genes say about your GST conjugation pathways, what it means for your health and what you can do to optimize these detoxification pathways.

Take Action:

Ensure proper glutathione status, production, and GST function: In addition to consuming foods to increase glutathione, consider the use of natural health products to increase glutathione production (NAC, glycine, selenium, magnesium, vitamin B6) and to increase glutathione transferase enzyme function (lipoic acid, whey protein, sulforaphane, curcumin, milk thistle).

Why?

According to your DNA test results, you have a **low risk for insufficient glutathione-S-transferase (GST) enzyme activity.** Insufficient GST activity is associated with poor estrogen metabolite elimination and risk for DNA damage. You have a reduced risk of developing disorders associated with improper estrogen detoxification such as endometriosis.
If you are experiencing symptoms such as thyroid dysfunction, decreased sex drive, irregular or abnormal menstrual periods, PMS, breast swelling and tenderness, fibrocystic breasts, insomnia, fatigue, or headaches, consult a physician to get your hormone levels tested.

It's in your genes

The Glutathione-S Transferases (GST) make up a superfamily of 8 enzymes that use glutathione to remove a variety of harmful compounds within cells. The GST enzymes, particularly GSTP1, remove harmful estrogen quinones, which are responsible for cellular and DNA damage. GST enzymes are found all over your body, however specific GST enzymes are found in different tissues. GSTP1 is found within reproductive tissues to affect local levels of oxidative stress. GSTT1 and GSTM1 are found throughout the body, and together with GSTP1 are essential for detoxification of hormones, drugs and environmental chemicals.
While a majority of the population carry two copies of every gene, deletions of GSTM1 and GSTT1 are relatively common, resulting in some individuals carrying fewer than two copies of these genes.

- According to your DNA results, you have **1 copy of GSTM1** and **1 copy of GSTT1.** Those with zero copies of GSTM1 and/or GSTT1 are at an increased risk for endometriosis.
- In addition, you are likely to have **normal GSTP1 activity**, which together, puts you in the **low risk category for DNA damage and low glutathione levels.**

Estrogen Detox (Methylation)

In addition to the 4-OHE:2-OHE ratio mentioned in the Estrogen Metabolism section, another important aspect of hormonal health is the body's ability to detoxify and remove harmful estrogen derivatives. This is known as "Phase 2 Metabolism" and involves conjugating or 'adding' chemical substances to estrogen metabolites. Conjugated estrogens are more water soluble to allow them to be more easily eliminated by the liver and kidneys, into stool and urine. The COMT gene encodes the Catechol-O-methyltransferase enzyme, and is responsible for adding 'methyl' groups to the 2-OHE and 4-OHE estrogen metabolites, so that they can be easily excreted. In order for COMT to function properly, it requires a methyl donor, or cofactor, called SAMe (S-adenosylmethionine). The availability of SAMe is influenced by the 'methylation pathway', including the MTHFR enzyme. Poor methylation can lead to rising levels of homocysteine, which can impact risk for poor reproductive health, such as anovulation, recurrent pregnancy loss and infertility. Without proper COMT activity, estrogen metabolism can be compromised, leading to elevations in estrogen or estrogen metabolites. Furthermore, high levels of estrogen metabolites provide negative feedback signals on aromatase, leading to hormone imbalances. Variants in Phase 2 Metabolism genes can affect the rate at which your body clears out toxic estrogen metabolites and thus are important to consider when looking at estrogen levels and hormonal health. Read on to learn what your genes say about your methyl pathways, what it means for your health and what you can do to optimize these detoxification pathways.

Take Action:

Methylation Support: You may require additional methylation support.

• Increase foods that contain nutrients such as betaine, choline, folate, vitamin B12, methionine and other B vitamins to support proper estrogen elimination through the 'methylation' pathway.

• Talk to a healthcare provider about replenishing cofactors to increase SAMe production and methylation pathways, including minerals; magnesium, zinc, and copper; B vitamins (B2, B3, B6, B12, and especially 5-MTHF); choline and betaine (TMG).

Certain medications, conditions/diseases, and lifestyle practices can increase the likelihood of folate deficiency. These include:

• **Medications:** anticonvulsants (including lamotrigine, valproate, carbamazepine); methotrexate (rheumatoid arthritis, psoriasis); sulfasalazine (inflammatory bowel disease, rheumatoid arthritis); birth control pill; metformin; fluoxetine (SSRI); niacin; fenofibrates; warfarin (coumadin); isotretinoin.

• **Diseases:** diabetes, atrophic gastritis, Celiac disease, inflammatory bowel disease (ulcerative colitis, Crohn's disease), renal failure.

• **Lifestyle:** alcohol, smoking, poor dietary intake, pregnancy.

Talk with your healthcare provider to **test for folate levels.**

Why?

According to your DNA test results, you are likely to have **normal COMT activity** and **decreased methylation**, which puts you at a **moderate risk for accumulated estrogen metabolites** (catechol estrogens).

It's in your genes

The MTHFR, MTR, MTRR and COMT genes encode the MTHFR, MTR, MTRR and COMT enzymes, respectively. These are all members of the Phase 2 Metabolism pathway and play a crucial role in the detoxification and elimination of harmful catechol estrogens.

COMT activity is important to limit the accumulation of catechol estrogens, which if allowed to accumulate, can increase the risk of hormone-dependent diseases.

• You have a version of the COMT gene that is associated with **fast enzyme activity**; however, given the likelihood of poor availability of SAMe (see below), you may be at **moderate risk for accumulation of catechol estrogens** and subsequent oxidative DNA damage.

Several enzymes within the methylation pathway are important in the production of SAMe, which is essential for the proper function of COMT. Variations in MTHFR, MTR, and MTRR enzymes can increase risk for high levels of homocysteine and are suspected to contribute to the low availability of SAMe. Elevations in homocysteine are linked to: oxidative stress; poor reproductive health, such as anovulation, recurrent pregnancy loss and infertility; dementia; as well as atherosclerosis, stroke and other cardiovascular diseases.

• You have a version of the **MTHFR** gene that is associated with **slow enzyme activity** and **reduced production of "active folate" (5-MTHF).**

• You have versions of the **MTRR** and **MTR** genes that are associated with **slow enzyme activity** and **reduced recycling of methylcobalamin and methionine.**

• Together, this combination of genetic variants may put you at a **high risk for elevations in homocysteine** and **likely lower availability of SAMe.**

Estrogen Metabolites

"Phase 1" of estrogen metabolism, involves the breakdown of estrogens (estradiol and estrone), by cytochrome P450 (CYP) enzymes. The main products of this breakdown are 2-hydroxyestrogen (2-OHE), which is considered protective, as well as 4-hydroxyestrogen (4-OHE) and 16a-hydroxyestrogen (16a-OHE), which are generally considered harmful as they retain their estrogen activity. It is crucial that the ratio of these estrogen metabolites is properly balanced as they have been shown to influence the production of reactive oxygen species (ROS) and risk for DNA damage. Elevated levels of DNA damage are associated with an increased risk of breast cancer in women. Genetic variations impact the types of estrogens that are formed and thus the ratio between the various estrogen metabolites produced. Read on to learn what your genes say about your CYP-mediated estrogen metabolism, what it means for your health, and what you can do to maintain a healthy hormone balance.

Take Action:

Consume various natural substances to reduce CYP1B1 activity and decrease the production of harmful estrogen metabolites (4-OHE), including: rooibos tea, celery, resveratrol, hops and bioflavonoids (luteolin, apigenin).
Consume a diet low in saturated fat and sugar and consider the use of resveratrol and NAC to reduce fibroids and limit oxidative stress within reproductive tissues.
Avoid common endocrine disruptors and persistent organic pollutants. Consider the use of DIM (3,3'-diindolylmethane; for premenopausal women only), resveratrol, and sulforaphane to reduce the risk of toxin-induced DNA damage.
To improve the production of protective estrogen metabolites, it is recommended that you increase your intake foods and compounds that balance CYP1A2 and CYP1A1 enzyme activity, such as; Cruciferous vegetables (cabbage, broccoli and Brussels sprouts), berries, flaxseed, rosemary, and astaxanthin.
• As a rule of thumb, ensure that you are getting 7g of cruciferous vegetables per kg of body weight per day. This can increase CYP1A2 activity by up to 20%.

Why?

According to your DNA test results, you are at a **high risk of having an increase in 4-OHE**, a harmful estrogen metabolite. High urinary concentrations of 4-OHE is linked to an increase in DNA damage.
You are also at **risk of having reduced production of 2-OHE** in the liver, a protective estrogen metabolite, and a **lower ratio of 2-OHE:16a-OHE** (only for premenopausal women).
In addition, you are also at risk for an **increased susceptibility to the damaging effects of certain environmental toxins** found in cigarette smoke, grilled and smoked meats, burning wood, exhaust, pesticides and pollution.

It's in your genes

The CYP1A1, CYP1A2 and CYP1B1 genes, produce the CYP1A1, CYP1A2, and CYP1B1 enzymes, respectively. These members of the cytochrome P450 family of enzymes play a direct role in Phase 1 estrogen metabolism. There are multiple estrogen metabolites produced during Phase 1 metabolism. CYP1A1 and CYP1A2 are responsible for producing protective estrogen metabolites, known as 2-OHE. CYP1A1 produces 2-OHE within extrahepatic tissues, including the placenta and breast, while CYP1A2 is the main enzyme in the liver responsible for estrogen metabolism. CYP1B1 is responsible for the local production of harmful estrogen metabolites, known as 4-OHE. CYP1B1 influences levels of 4-OHE within reproductive tissues, and is thought to influence local levels of DNA damage and risk for breast and other types of cancer.
CYP1B1, found primarily in reproductive tissues such as ovaries, uterus, and breast tissue, is involved in the conversion of estrogens into 4-OHE, a harmful estrogen metabolite.
• You have a version of the CYP1B1 gene that **significantly increases the activity of the CYP1B1 enzyme**, which may put you at risk for increased production of 4-OHE.
You have a **"highly inducible"** version of **CYP1A1**, which is associated with an increase in the conversion of estrogens into 2-OHE, a protective estrogen metabolite. Although an increase in 2-OHE is generally associated with a reduced incidence of breast cancer, this enzyme also interacts significantly with the environment to influence health. This is because CYP1A1 is involved in the metabolism of environmental toxins, creating oxidants that lead to DNA and tissue damage.
• This highly inducible form of the CYP1A1 gene means there is a 2 to 3-fold increase in enzyme activity in the presence of estrogen and environmental toxins, such as polycyclic aromatic hydrocarbons (PAH), dioxins, nitrosamines, and aromatic amines. Exposure to these chemicals and their harmful intermediates are linked to DNA damage and oxidative stress. You may have an **increased susceptibility to the damaging effects of these chemicals.**
• This version of CYP1A1 is associated with an **increased risk of fibroids**, especially in Asian and Caucasian populations.
In addition to its role in estrogen metabolism, **CYP1A2** is the primary enzyme responsible for caffeine metabolism. Variations within this gene impact the speed at which you metabolize caffeine.
• You have a version of CYP1A2 that is associated with **decreased CYP1A2 activity**, which is linked to a lower ratio of urinary 2-OHE:16a-OHE in premenopausal women.

Report summary

LoveMyHealth™ analyzes the following 127 genetic markers within 96 genes. These genes were selected based on their clinically relevant impact on the body's various metabolic pathways, including the absorption and metabolism of nutrients, detoxifying mechanisms, the functioning of muscles, and others. Also, their association as risk factors, such as for vitamin deficiencies, obesity and other metabolic diseases, have been well established. **NOTE:** Your overall health is influenced not only by these factors, but also by additional genetic and non-genetic (environmental, diet, etc.) factors; thus, carrying a risk variant associated with a certain deficiency does not necessarily mean that you will experience that deficiency, especially if you are already following a healthy diet and lifestyle. The recommendations provided in this report may be especially helpful if you are experiencing certain symptoms or looking to optimize your health through informed lifestyle choices.

Diet and Heart Health

Carbohydrate Consumption

Genes (SNPS)	Typical	Atypical	Your Results
TCF7L2 (rs12255372)	G	T	GG
CRY1 (rs2287161)	G	C	CC

Action Plan:
Higher risk of abnormal glucose balance and insulin resistance with high carbohydrate consumption.

Reduce simple, refined carbohydrate intake.

Fat Consumption

Genes (SNPS)	Typical	Atypical	Your Results
FADS1 (rs174537)	T	G	GG
LIPC (rs1800588)	C	T	CC
TNFa (rs1800629)	A	G	GG
IL6 (rs1800797)	A	G	GG
ADIPOQ (rs266729)	G	C	GG
LEPR (rs3790433)	A	G	GG
APOA2 (rs5082)	T	C	TT

Action Plan:
Increased risk of certain adverse health conditions when you consume higher amounts of saturated fat and insufficient omega-3 fatty acids.

Reduce saturated fat intake and consume adequate omega-3 fatty acids.

Eating for Heart Health

Genes (SNPS)	Typical	Atypical	Your Results
LPL (rs328)	G	C	GG
MLXIPL (rs3812316)	G	C	CC
CLOCK (rs4580704)	G	C	GG

Action Plan:
Higher risk of elevated triglyceride levels. Normal risk of Type 2 Diabetes, obesity, or cardiovascular disease.

See your healthcare practitioner about having your triglyceride levels tested. If high, consuming a mediterranean diet, increasing intake of complex carbohydrates and omega-3 fatty acids, reducing alcohol intake, losing weight, and exercising regularly may help.

Risk for Heart Disease

Genes (SNPS)	Typical	Atypical	Your Results
9p21 (rs10757274)	A	G	AG
9p21 (rs10757278)	A	G	AG

Action Plan:
You have genetic variants associated with a slightly increased risk of cardiovascular disease.
Follow the DASH diet and increase the quality of fats in your diet. Limit consumption of alcohol and avoid smoking while staying active. Be sure to maintain body weight as well as manage diabetes and hypertension.

Sensitivities

Lactose

Genes (SNPS)	Typical	Atypical	Your Results
MCM6 (rs4988235)	A	G	GG

Action Plan:
Version of gene associated with reduced lactase production, resulting in higher risk for lactose intolerance.

See your healthcare practitioner about being tested for lactose intolerance. Also reduce or eliminate dairy products from diet to improve gastrointestinal health. Ensure calcium is consumed through other food sources.

Caffeine

Genes (SNPS)	Typical	Atypical	Your Results
CYP1A2 (rs762551)	A	C	CA

Action Plan:
You have a version of this gene that is associated with being a medium caffeine metabolizer. Sometimes you will feel jittery or restless, but others you will not.

Keep consumption of caffeine to less than 400mg daily (three 8-ounce cups of regular coffee).

Sodium

Genes (SNPS)	Typical	Atypical	Your Results
ACE (rs4343)	C	T	CT

Action Plan:
Version of gene associated with increased sensitivity to salt. May be at risk of blood pressure increases when sodium intake is high.

Limit sodium consumption to recommended levels of 1200-1500 mg/day, depending on age. Choose foods lowest in sodium and avoid packaged/processed foods.

Gluten

Genes (SNPS)	Typical	Atypical	Your Results
HLA (rs2395182)	G	T	TT
HLA (rs7454108)	T	C	CC
HLA (rs7775228)	A	G	AA
HLA (rs4713586)	G	A	AA
HLA (rs2187668)	G	A	GG
HLA (rs4639334)	G	A	GG

Action Plan:
Versions of human leukocyte antigen (HLA) genes resulting in high risk of gluten sensitivity.

See healthcare practitioner about being tested for celiac disease. Try eliminating gluten from diet to see if health improves.

Alcohol

Genes (SNPS)	Typical	Atypical	Your Results
ADH1B (rs1229984)	T	C	CT
ALDH2 (rs671)	C	T	CC
ADH1C (rs698)	A	G	AA

Action Plan:
Typical versions of genes involved in alcohol metabolism. No risk of alcohol flush and reduced risk of alcohol use disorders.

Follow guidelines outlined in your report for healthy alcohol consumption.

Specific Nutrient Needs

Vitamin A

Genes (SNPS)	Typical	Atypical	Your Results
BCMO1 (rs11645428)	A	G	GG
BCMO1 (rs12934922)	A	T	AT
BCMO1 (rs7501331)	G	A	GG

Action Plan:
Version of gene associated with reduced conversion of beta carotene into vitamin A.

Follow recommendation outlined in your report for daily vitamin A intake from animal sources or through daily supplements. Plant sources rich in beta carotene may be inadequate to meet nutritional needs.

Vitamin B12, Folic Acid, Vitamin B2

Genes (SNPS)	Typical	Atypical	Your Results
MTHFR (rs1801131)	A	C	CA
MTHFR (rs1801133)	G	A	AG
MTRR (rs1801394)	T	C	CC
MTR (rs1805087)	A	G	GA
COMT (rs4680)	C	T	CT
FUT2 (rs602662)	T	C	TT

Action Plan:
You have the version of genes associated with a risk of decreased homocysteine conversion, leading to reduced dietary folate metabolism, and may result in a higher than typical need for vitamin B12 to prevent deficiency and to prevent excess homocysteine.

See your healthcare practitioner to test your homocysteine levels. Supplement with 5-methylfolate and vitamin B12 sourced from methylcobalamin or hydroxycobalamin (taken sublingually). You may find methylcobalamin forms too stimulating, in which case supplement with hydroxycobalamin. Additionally, follow recommendations outlined in your report for daily intake of folate-rich food and vitamin B2 (riboflavin).

Vitamin C

Genes (SNPS)	Typical	Atypical	Your Results
GSTTI (rs2266633)	C	0	CC

Action Plan:
You have the typical version of the gene associated with normal glutathione detoxification through GSTT1, as well as with adequate serum levels of vitamin C.

No gene-specific recommendations for you based on your test results. For your best health, follow guidelines outlined in your report for daily vitamin C intake.

Vitamin D & Calcium

Genes (SNPS)	Typical	Atypical	Your Results
CYP2R1 (rs10741657)	A	G	GG
VDR (rs1544410)	C	T	CT
CYP2R1 (rs2060793)	C	T	CC
GC (rs2282679)	A	C	CA
GC (rs7041)	G	T	GT

Action Plan:
You have the version of genes associated with risk of vitamin D deficiency and proper maintenance of bone mineral density.

Supplement with cholecalciferol vitamin D daily. See your healthcare practitioner to test your serum vitamin D levels. For your best health, meet the daily calcium intake recommendations outlined in your report.

Vitamin E

Genes (SNPS)	Typical	Atypical	Your Results
F5 (rs6025)	C	T	CC

Action Plan:
You have the typical version of the gene associated with normal risk for blood clotting disorders.

No gene-specific recommendations for you based on your test results. For your best health, follow guidelines outlined in your report for daily vitamin E intake.

Iron

Genes (SNPS)	Typical	Atypical	Your Results
HFE (rs1799945)	C	G	CC
HFE (rs1800562)	C	T	CC
TF (rs3811647)	G	A	GG
TMPRSS6 (rs4820268)	A	G	GG
TFR2 (rs7385804)	A	C	CA

Action Plan:
Typical version of gene leading to normal risk of iron overload (hemochromatosis). Atypical version of gene/s, resulting in higher risk for iron deficiency anemia.

Consume enough iron in diet by following guidelines outlined in your report. If unable to meet requirements by diet, consider taking an iron supplement and Vitamin C for enhanced absorption.

Antioxidants

Genes (SNPS)	Typical	Atypical	Your Results
SOD2 (rs4880)	C	T	TT

Action Plan:
Version of gene associated with lower enzyme activity, leading to increased risk of oxidative stress and cellular damage.

Increase antioxidant intake through diet or with the help of supplements.

Specific Nutrient Needs

Omega-3 Fatty Acids

Genes (SNPS)	Typical	Atypical	Your Results
FADS2 (rs1535)	T	C	TT
IL6 (rs1800795)	C	G	CC
IL6 (rs1800797)	A	G	GG

Action Plan:
Typical version of genes leading to efficient conversion of dietary ALA into EPA/DHA. Version of gene resulting in increased risk of metabolic syndrome when omega-3 fatty acid intake is low.

Consume enough omega-3 fatty acids in diet through either plant- or animal-based sources to meet daily requirements outlined in your report. Fish oil or flaxseed oil supplements may help meet daily needs.

Probiotics

Genes (SNPS)	Typical	Atypical	Your Results
FUT2 (rs602662)	C	T	TT

Action Plan:
Version of gene that may negatively affect gut microflora levels.

Supplement with Bifidobacterium, as well as prebiotic 2'-fucosyllactose for optimal gut health.

Choline

Genes (SNPS)	Typical	Atypical	Your Results
FADS1 (rs174548)	G	C	GG
PEMT (rs7946)	G	A	AG

Action Plan:
Version of genes associated with having reduced phosphatidylcholine levels.

Ensure that you meet recommended levels of daily choline intake, outlined in your report. Consider taking a phosphatidylcholine supplement, unless on cholinergic or anticholinergic drugs.

Physical Fitness

Pain Tolerance

Genes (SNPS)	Typical	Atypical	Your Results
COMT (rs4680)	C	T	CT

Action Plan:
You have a version of the gene associated with higher pain tolerance. You are likely to experience less pain when exercising.

No gene-specific recommendations for you based on your test results.

Endurance vs. Power

Genes (SNPS)	Typical	Atypical	Your Results
ACTN3 (rs1815739)	C	T	TT
ACE (rs4343)	C	T	CT

Action Plan:
You have the version of genes associated with both power and endurance exercise.

Incorporate both power exercises (i.e. high intensity resistance training, weights) and endurance exercises (low intensity resistance training, walking, jogging, swimming, biking) into your regimen.

Exercise Motivation

Genes (SNPS)	Typical	Atypical	Your Results
LEPR (rs12405556)	A	C	CC
BDNF (rs6265)	A	G	GG

Action Plan:
You have a version of genes associated with lower motivation to exercise.

Try implementing strategies to encourage exercise (i.e. finding a physical activity that you enjoy doing, working out with a friend, joining an exercise class, using a personal trainer, or sharing your progress with family and friends). Try to engage in 20-30 minutes/day of moderate to high intensity cardiovascular exercise and add in resistance training 1-3 times/week.

Exercise Recovery

Genes (SNPS)	Typical	Atypical	Your Results
CRP (rs1205)	T	C	TT
TNFa (rs1800629)	G	A	GG
IL6 (rs1800795)	C	G	CC
IL6-R (rs2228145)	T	G	TG
SOD2 (rs4880)	C	T	TT

Action Plan:
You have the versions of the genes associated with highest risk for muscle damage, fatigue, and inflammation following exercise. Your variant is also associated with a decreased natural ability to remove free radicals produced during high intensity exercise.

It is essential for you to get adequate rest following exercise. Consider adding omega-3 fatty acids to your diet to improve exercise recovery. Consider consuming curcumin and/or N-acetylcysteine (NAC) if you engage in high intensity exercise.

Physical Fitness

Exercise Benefits for Type 2 Diabetes

Genes (SNPS)	Typical	Atypical	Your Results
PPARG (rs1801282)	C	G	CC

Action Plan:
You have a version of the gene associated with normal impact of exercise on managing type 2 diabetes.

No gene-specific recommendations. Exercising regularly will still provide health benefits, including reducing risk of developing type 2 diabetes.

Bone Health

Genes (SNPS)	Typical	Atypical	Your Results
VDR (rs1544410)	C	T	CT
IL6 (rs1800796)	G	C	GG

Action Plan:
You have a version of the genes associated with higher risk of bone loss and of fracture.

Follow exercises recommended in your report to protect your bones. These include strength training, balance training, weight-bearing aerobic physical activity, and posture training.

Injury Risk

Genes (SNPS)	Typical	Atypical	Your Results
COL5A1 (rs12722)	C	T	CT

Action Plan:
You have a version of the gene associated with a higher risk of exercise-related injury.

Stretch muscles prior to and following exercise, especially lower leg muscles.

Exercise Preference

Genes (SNPS)	Typical	Atypical	Your Results
NOS3 (rs1799983)	G	T	GG

Action Plan:
You have a version of the gene associated with higher production of nitric oxide and an increased preference for vigorous exercise.

Consider exercise programs that include vigorous activities (i.e. running, spinning, high intensity interval training/HIIT, intense swimming, power yoga, and pilates).

Brain Health

Predisposition to Addiction - Nicotine/Cocaine

Genes (SNPS)	Typical	Atypical	Your Results
CHRN (rs16969968)	C	T	CT

Action Plan:
You have a version of the gene associated with enhanced pleasurable response to your first cigarette and increased likelihood of nicotine addiction. You may also have a protective effect against cocaine dependance.

Despite being at risk of smoking addiction, try to reduce and eliminate smoking if you currently smoke or avoid starting if you currently do not smoke.

Mood

Genes (SNPS)	Typical	Atypical	Your Results
MAOA (rs6323)	A	C	AA

Action Plan:
You have a version of the gene associated with a decrease in MAOA activity, leading to higher likelihood of emotional arousal and more impulsive behaviour.

Ensure that you are getting enough vitamin B2 (riboflavin), improve your sleep habits, and avoid MAO inhibitors.

Memory

Genes (SNPS)	Typical	Atypical	Your Results
DRD2 (rs6277)	C	T	CT

Action Plan:
You have a version of the gene associated with decreased levels of dopamine, which can negatively affect cognition and memory.

Improve your dopamine levels by consuming adequate zinc, folate, and vitamin B6 in your diet, according to daily intake guidelines. Consider using supplements if unable to consume adequate amounts in your diet.

Cognitive Performance and Stress Resilience

Genes (SNPS)	Typical	Atypical	Your Results
COMT (rs4680)	C	T	CT

Action Plan:
You have the "worrier" version of this gene, associated with lower COMT activity and higher levels of catecholamines (dopamine, epinephrine, norepinephrine) and estrogen. You may experience alertness, wakefulness, and occasional sleeplessness/restlessness. You may also have a lower pain threshold, increased sensitivity to stimulants, and difficulties with stress. You also likely have enhanced working memory and cognitive function and are more efficient at processing information.

Enhance COMT activity to improve stress resilience by consuming foods high in magnesium or supplementing with magnesium in the glycinate or malate forms. Avoid COMT inhibition from undergoing excess stress and consuming high protein diets, green tea, quercetin supplements, and stimulants.

Brain Health

Alzheimer's Disease Risk

Genes (SNPS)	Typical	Atypical	Your Results
APOE (rs7412)	C	T	CT
APOE (rs429358)	T	C	TT

Action Plan: You carry one copy each of the E2 and E3 variations, which is associated with a decreased risk of 0.62-fold for developing late-onset Alzheimer's disease. Although rare, this genotype is also associated with an increased susceptibility to type III hyperlipoproteinemia with increased levels of triglycerides. Though there are no gene-specific recommendations according to your genotype in regards to the development of late-onset Alzheimer's Disease, fish oil supplements may be beneficial in reducing triglyceride levels in the body.

Detox

Sulfur Removal

Genes (SNPS)	Typical	Atypical	Your Results
CBS (rs4920037)	G	A	AG

Action Plan:
You carry a genetic variant which is associated with lower levels of CBS, and less efficient sulfur metabolism. This may put you at risk of having higher levels of homocysteine than what is desirable for optimal health.

Talk to your health care practitioner about having your homocysteine level tested. If you have higher than normal levels of homocysteine, it is recommended that you supplement with NAC (N-Acetyl-L-Cysteine). Also ensure that you are getting enough vitamins B2 and B6 in your diet or as part of a B-complex supplement.

Ability to Remove Chemicals in Smoked and Charred Meats

Genes (SNPS)	Typical	Atypical	Your Results
CYP1A2 (rs762551)	C	A	CA

Action Plan:
You have version of the gene associated with being a "medium metabolizer", meaning that you may clear out toxic compounds in smoked and grilled meats relatively slower than what is desirable.

Limit your consumption of charred and smoked meats to decrease your risk of cancer. Reduce processed meats (i.e. deli meats, bacon, hot dogs) and consume less than 500g of red meat, according to weekly intake guidelines.

Glutathione Detox

Genes (SNPS)	Typical	Atypical	Your Results
GSTP1 (rs1138272)	C	T	CC
GSTP1 (rs1695)	A	G	AG
GPX1 (rs1050450)	C	T	CC
GSTT1 (gstt1)	2N	-	1N
GSTM1 (gstm1)	2N	-	1N

Action Plan:
You carry genetic variants associated with slightly reduced glutathione activity, which may increase your risk for diseases related to oxidative stress such as cardiovascular disease and some cancers. Support your glutathione detox by increasing your intake of cruciferous vegetables.

Histamine Removal

Genes (SNPS)	Typical	Atypical	Your Results
DAO (rs10156191)	C	T	CC
HNMT (rs1050891)	G	A	AG
HNMT (rs11558538)	C	T	CC

Action Plan:
You have genetic variants associated with reduced function, meaning that you may have reduced ability to break histamines down effectively following exposure to environmental allergens. This may lead to allergenic symptoms.

Consume foods that are low in histamine, and limit your consumption of histamine rich foods, histamine releasing foods, and diamine oxidase (DAO) blocking foods. Also, several drugs release histamine or inhibit DAO. Talk to your doctor if you are currently taking any of these medications.

Obesity Risk

Preference for Dietary Fat

Genes (SNPS)	Typical	Atypical	Your Results
CD36 (rs1761667)	G	A	AA

Action Plan:
According to your genetic test results, you are more likely to have the highest taste sensitivity to (and preference for) dietary fat, which can put you at risk for excess fat consumption, possibly leading to obesity.

Try to stay within the recommended daily fat intake of 65g/day (30% of your daily caloric intake).

Genetic Risk Score for Obesity

Genes (SNPS)	Typical	Atypical	Your Results
GCKR (rs1260326)	C	T	TT
CELSR2 (rs12740374)	G	T	GG
MC4R (rs17782313)	T	C	TT
NOS3 (rs1799983)	G	T	GG
PPARA (rs1800206)	G	C	GG
LIPC (rs1800588)	C	T	CC
CETP (rs1800777)	G	A	GG
MTHFR (rs1801133)	G	A	AG
PPARG (rs1801282)	C	G	CC
LPL (rs328)	G	C	GG
LIPG (rs4939833)	G	A	AA
APOA5 (rs662799)	A	G	AA
PLIN1 (rs894160)	C	T	CC
FTO (rs9939609)	A	T	AT

Action Plan: According to your genetic risk score, you may have a slightly elevated risk of obesity, and certain eating patterns will exacerbate this risk. To reduce your obesity risk, you are encouraged to reduce your overall caloric intake (including proteins, fats, and carbohydrates), as well as to reduce your consumption of fried food and sugar sweetened beverages.

Eating Behaviour

Genes (SNPS)	Typical	Atypical	Your Results
PLIN1 (rs1052700)	T	A	TT
PER2 (rs2304672)	C	G	CC

Action Plan:
There are no gene-specific recommendations for you based on your test results, as they don't point towards you being at increased risk of obesity as a result of the timing of your meals.

You are encouraged to follow a healthy lifestyle including exercise and a balanced diet to prevent you from becoming overweight or obese. The timing of your lunch is not likely to influence your ability to lose weight.

Regulation of Appetite and Food Intake

Genes (SNPS)	Typical	Atypical	Your Results
MC4R (rs17782313)	T	C	TT
FTO (rs9939609)	A	T	AT

Action Plan:
Your genetic variants may put you at increased risk of obesity, especially when your saturated fat intake is high. FTO is the most significant gene in determining your obesity risk and it can impact your ability to successfully lose weight and keep it off.

Following the mediterranean diet will help decrease your risk of obesity and Type 2 Diabetes, and those who are physically active have been found to be less susceptible to FTO gene-related obesity, so get moving!

Hormonal Health

Thyroid Health

Genes (SNPS)	Typical	Atypical	Your Results
CAPZB (rs10917469)	T	C	CT
PDE8B (rs4704397)	G	A	GG

Action Plan:
There are no specific recommendations for you based on this gene, as you carry a version that is not associated with a higher than normal risk for reduced or overactive thyroid function.

Testosterone

Genes (SNPS)	Typical	Atypical	Your Results
SHBG (rs12150660)	T	G	GT
SHBG (rs6258)	G	A	GG

Action Plan:
You have a version of the SHBG gene that is associated with lower levels of free circulating, usable testosterone.

See your healthcare practitioner about having your testosterone levels tested and consider taking steps to boost testosterone.

Hormonal Health

Estrogen Detox (Glutathione)

Genes (SNPS)	Typical	Atypical	Your Results
GSTP1 (rs1138272) *	C	T	CC
GSTP1 (rs1695)	A	G	AG
CBS (rs234706) *	G	A	AG
SOD2 (rs4880) *	C	T	TT
GPX1 (rs1050450) *	C	T	CC
GSTT1 (gstt1)	2N	-	1N
GSTM1 (gstm1)	2N	-	1N

** Displayed here but not used in the algorithm*

Action Plan:
You have 1 copy of GSTM1, 1 copy of GSTT1, and are likely to have normal GSTP1 activity. This gene combination is associated with a low risk for DNA damage from estrogen quinones.

Ensure you consume foods rich in cysteine and selenium to maintain healthy glutathione levels.

Estrogen Detox (Methylation)

Genes (SNPS)	Typical	Atypical	Your Results
MTHFR (rs1801131)	A	C	AC
MTHFR (rs1801133)	G	A	AG
MTRR (rs1801394)	T	C	CC
MTR (rs1805087)	A	G	AG
COMT (rs4680)	C	T	CT
FUT2 (rs602662) *	T	C	TT
TCN2 (rs1801198) *	C	G	CG
SHMT1 (rs1979277) *	G	A	AG

** Displayed here but not used in the algorithm*

Action Plan:
According to your DNA test results, you have a high risk of elevations in homocysteine and lower availability of SAMe due to your 'slow' versions of MTRR, MTR and MTHFR. Together, with your 'fast' version of COMT, there is likely a moderate risk for accumulation of catechol estrogens and subsequent oxidative DNA damage.

Consider the use of natural health products to support methylation, including magnesium, zinc, and copper; B vitamins (B2, B3, B6, and especially B12, 5-MTHF); choline and betaine (TMG) to support proper estrogen elimination.

Estrogen Metabolites

Genes (SNPS)	Typical	Atypical	Your Results
CYP1A2 (rs762551)	A	C	AC
CYP1A1 (rs1048943)	A	G	AG
CYP1B1 (rs1056836)	C	G	GG

Action Plan:
According to your DNA test results you have an increased risk of producing excess 4-OHE. You also have genetic variants associated with a lower ratio of urinary 2-OHE:16a-OHE in premenopausal women. Lastly, according to your genes, you may have an increased susceptibility to the damaging effects of environmental toxins, and an increased risk for fibroids.

Consider cruciferous vegetables (7g/kg bw), flaxseed, rosemary, rooibos tea, and hops to reduce the production of 4-OHE; and DIM (3,3'-diindolylmethane; for premenopausal women only), resveratrol, and sulforaphane to reduce the risk of toxin-induced DNA damage.

LoveMyHealth - LoveMyHealth-PRO

The *LoveMyHealth* CLINICAL PANEL is an add-on to the base LoveMyHealth test, and includes genotype results for an additional 44 genetic markers within 38 genes. These additional markers were selected based on their reported associations with various clinical outcomes related to diet, detoxification, heart health, hormonal health, mental wellness, obesity risk, physical fitness, and specific nutrient needs. **NOTE:** This CLINICAL PANEL add-on is designed for (and available only to) practitioners that are familiar with the clinical impact of these genetic variants - it is up to the practitioner to make their own interpretations and recommendations to their patients based on these results and considered in the context of a global assessment of the patient.

Detoxification

Genes (SNPS)	Typical	Atypical	Your Results
GSTM1 (gstm1)	2N	-	1N
GSTT1 (gstt1)	2N	-	1N
GPX1 (rs1050450)	C	T	CC
CBS (rs234706)	G	A	AG

Diet

Genes (SNPS)	Typical	Atypical	Your Results
AMY1 (rs4244372)	T	A	TT
TCF7L2 (rs7903146)	C	T	CC

Heart Health

Genes (SNPS)	Typical	Atypical	Your Results
9P21 (rs10757274)	A	G	AG
9P21 (rs10757278)	A	G	AG
SLCO1B1 (rs4149056)	T	C	TT
APOE (rs429358)	T	C	TT
APOE (rs7412)	C	T	CT

Hormone Health

Genes (SNPS)	Typical	Atypical	Your Results
GSTM1 (gstm1)	2N	-	1N
GSTT1 (gstt1)	2N	-	1N
CYP19A1 (rs10046)	C	T	CT
CYP1A1 (rs1048943)	A	G	AG
GPX1 (rs1050450)	C	T	CC
CYP1B1 (rs1056836)	C	G	GG
TCN2 (rs1801198)	C	G	CG
UGT2B15 (rs1902023)	T	G	TT
SHMT1 (rs1979277)	G	A	AG
CBS (rs234706)	G	A	AG
CYP19A1 (rs2470158)	G	A	GG
CYP1A2 (rs2472299)	G	A	AG
CYP1A2 (rs2472300)	G	A	AG
CYP3A4 (rs2740574)	T	C	TT
SRD5A2 (rs523349)	C	G	GG
FAM9B (rs5934505)	C	T	CC
CYP17A1 (rs743572)	A	G	AG
UGT2B17 (ugt2b17)	2N	-	2N

Mental Wellness

Genes (SNPS)	Typical	Atypical	Your Results
5-HTTLPR (httlpr5)	L	S	LL
DRD2 (rs1799732)	C	D	CC
ADRA2B* (rs28365031)	12	-	12/12

** The number here lists the total number of glutamine residue repeats in ADRA2B - 12 is the `typical` value.*

Obesity Risk

Genes (SNPS)	Typical	Atypical	Your Results
UCP1 (rs1800592)	T	C	CT
SLC2A2 (rs5400)	C	T	CC

Physical Fitness

Genes (SNPS)	Typical	Atypical	Your Results
NRF2 (rs12594956)	A	C	AC
NFIA-AS2 (rs1572312)	G	T	GG
UCP1 (rs1800592)	T	C	CT
ADRB3 (rs4994)	G	A	AA
GABPB1 (rs7181866)	A	G	AA

Specific Nutrient Needs

Genes (SNPS)	Typical	Atypical	Your Results
CYP2R1 (rs12794714)	C	T	TT
SLC17A1 (rs17342717)	C	T	CC
TCN2 (rs1801198)	C	G	CG
SHMT1 (rs1979277)	G	A	AG
SLC23A1 (rs33972313)	C	T	CC
GC (rs4588)	G	T	GT
NBPF3 (rs4654748)	T	C	CC
FUT2 (rs492602)	A	G	GG
FUT2 (rs601338)	G	A	AA
LTA (rs915654)	A	T	AA