Genetica®

U-Detox

Detoxification ability

Explore Your Genes
Define Your Future

www.genetica.asia

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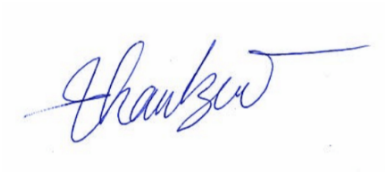

Duyen Bui
Founder & Chief Science Officer
at Genetica®

Rama Kota
Lead Human Geneticist

Dear Ms. Nguyễn Thị B,

On behalf of Genetica® team, I would like to send you our warmest greetings with deepest gratitude for your interest and trust in our Genetica® gene decoding technology consultation service.

With the recipe for success of prestigious and reputable scientists in the genetics field and artificial intelligence technology, Genetica® sincerely believes that we can bring about greater values and meanings into each of our customers' lives. This is the mission, the aim I and my colleagues are pushing our hardest efforts to reach. Everyday, we thrive to seek for more knowledge and to perfect our service, bringing gene decoding closer to public's heart. The precious gem of unlocking one's genomes is no longer limited to elitists of expertise knowledge, with Genetica®, it now extends its embrace to you, to your family and to everyone, the embrace of unearthing uncountable mysteries buried deep in our unique genomes using scientific technologies.

Our dear customer, the report on your hand now narrates a map for you to explore yourself thoroughly and to listen to your own body. From this map, you can direct your own ultimate working, fitness, rest, education, and diet plans towards your best life.

On choosing "Genetica®, Explore your genes - Define your future", you will always be accompanied with our most experienced experts for all consultations needed. Therefore, do not hesitate to contact us should you have any inquiries upon your results. You can also log into our Genetica® application to update helpful information curated specifically for your genomes.

We truly hope you have had a great experience using our service.

It was our greatest pleasure being your guide on this journey,

Cao Anh Tuan
Founder & Chief Technology Officer at Genetica®

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BACKGROUND

Human genomes contain 20,000 to 25,000 genes. Genes in our bodies are inherited from our parents. Some genes don't have any negative effects, but some definitely do. Our genes make us unique as the way we are.

Basic Terminologies in Genomics

Genome

A gene is the basic unit of heredity which is a phenomenon of parents passing on their characteristics to offspring. In most cases, the material constituting genes are DNA, and genes are passed on to the next generation by replicating DNA. DNA carries genetic code, defined by 4 different bases A, T, G, C.

DNA

DNA, or deoxyribonucleic acid, is the hereditary material in humans and almost all other organisms. Nearly every cell in a person's body has the same DNA. The information in DNA is stored as a code made up of four chemical bases: adenine (A), guanine (G), cytosine (C), and thymine (T).

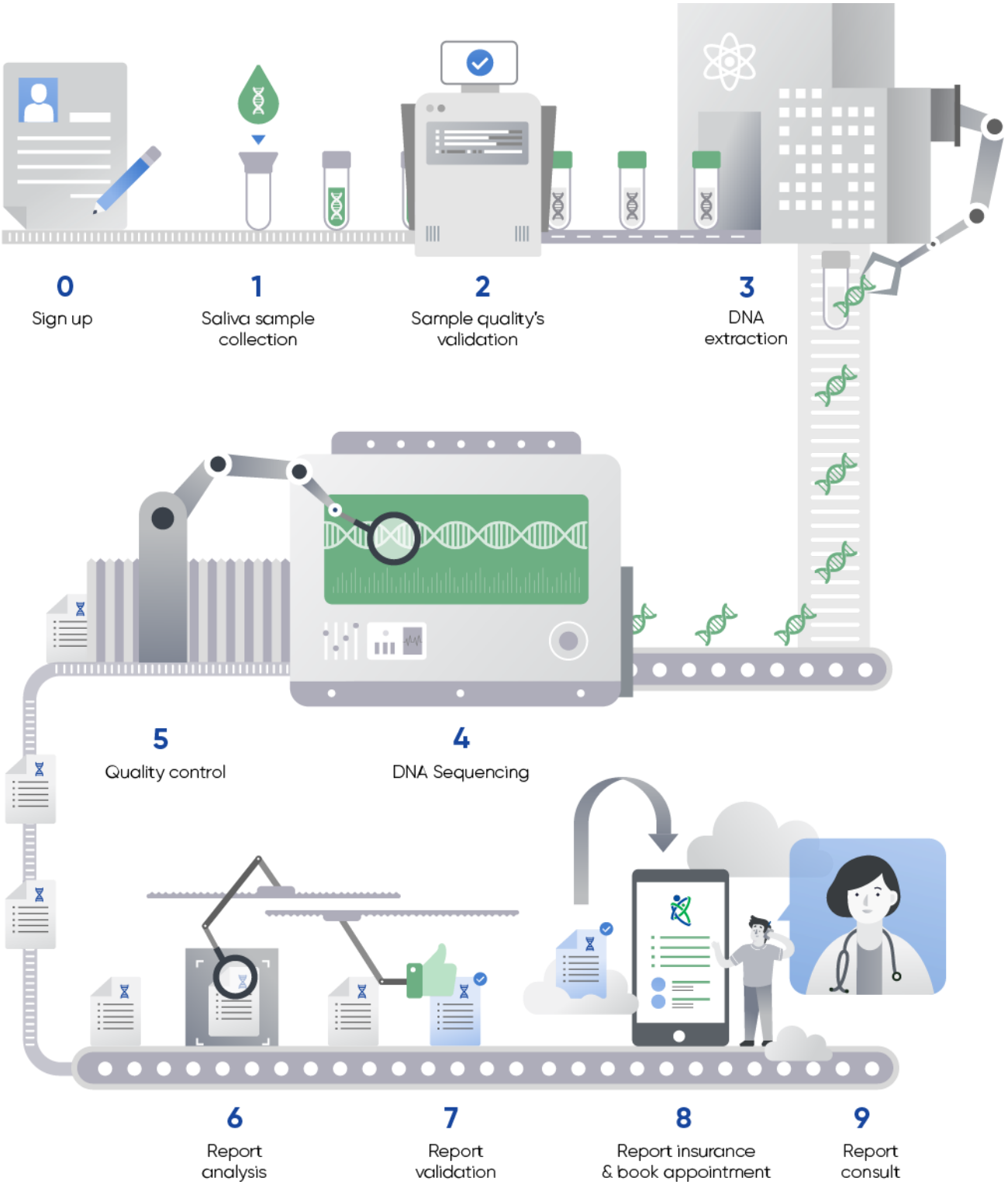
A **single-nucleotide polymorphism (SNP, pronounced snip)** is a DNA sequence variation occurring when a single nucleotide adenine (A), thymine (T), cytosine (C), or guanine (G) in the genome (or other shared sequence) differs between members of a species or paired chromosomes in an individual.

Mutation

Mutation is a change that occurs in our DNA sequence, either due to mistakes when the DNA is copied or as the result of environmental factors such as UV light and cigarette smoke.

Genes can be referred to as the "integrated body of information" which constitutes our bodies, and the purpose of genetic testing is to learn the genetic impacts of the occurrence of a specific disease in advance, and moreover, to control environmental factors as much as possible.

HOW THIS REPORT IS GENERATED?



GENETIC TESTING: AN OVERVIEW

Technological advances have dramatically impacted almost every aspect of daily life, especially in healthcare. Scientists study the complete DNA sequences and perform genetic mapping to help understand what causes disease, what makes a person to lose weight or gain weight faster than the others, and individual differences in behaviors, such as cognitive ability and personality.

With a few drops of saliva, a person can gain a wealth of personal insights. For example, a person with family history of breast cancer can find out if she carries a mutation in BRCA genes. Research shows that mutations in breast cancer (BRCA) genes significantly increase the chances of cancer. In particular, a BRCA1 mutation can increase the chances of breast cancer up to 81% and ovarian cancer up to 54%. Genetic tests will provide the information a user and their doctor need in order to take appropriate preventive actions.

On another spectrum, parents can **leverage genetic information** to create an optimal education plan to **unlock their child's potentials. Every child is unique**. A one-size-fits-all education will hinder children to unleash their innate talents. A child who has a tendency to be extrovert performs prolonged study everyday, which may lead to depression. For the past two decades, researchers have found dozens of genes that increase a child's susceptibility to anxiety, attention-deficit hyperactivity disorder, heightened risk-taking, and antisocial. However, unless the child suffers a traumatic or stressful childhood, the above traits are not revealed when they grow into adulthood. Genetic studies have shown that children with certain gene variants may need and benefit greatly from more maternal support.

According to Dr. Jennifer Stagg, the author of the (best seller) book **Unzip your genes, genomic testing provides information that was not clinically available just a few years ago**. She can now provide guidance to patient questions such as, "It seems like I get fat when I weight-train. Is that possible?" or "I've tried every low-carb diet and it doesn't work. How could that be?" It is really quite simple. A patient's saliva sample can provide answers. "Mrs. Smith, genetically you are predisposed to gain fat mass with an intensive strength training program" and "Mr. Morgan, with your genetic makeup, you will do better on a Mediterranean diet."

Genomics allows us to see how variations in our DNA can interact with one another and impact our growth, behavior and overall health. However, **our genes are not our destiny**. The way our genes get expressed is also affected by our lifestyle, environmental and psychosocial factors.

TABLE OF CONTENT

INTRODUCTION TO U-DETOX

Detoxification ability.

Detoxification is complicated. But it's a vital process that rids our bodies of harmful substances so that we can stay healthy and function optimally.

Undeniably, the world we live in is full of toxic substances. And we're exposed to them constantly—in the air, foods, personal products, and cleaning solutions. The CDC has identified over 100,000 chemicals in our environment, with 1,000 new ones introduced each year.

Without detoxification, the accumulation of these toxins can put a strain on our health, lead to unwanted diseases, and accelerate aging.

Your genes can influence how effectively your body can handle toxins. And depending on your genetic variations, your sensitivity to certain chemicals (and therefore risk of diseases), may be significantly different from the person standing next to you.

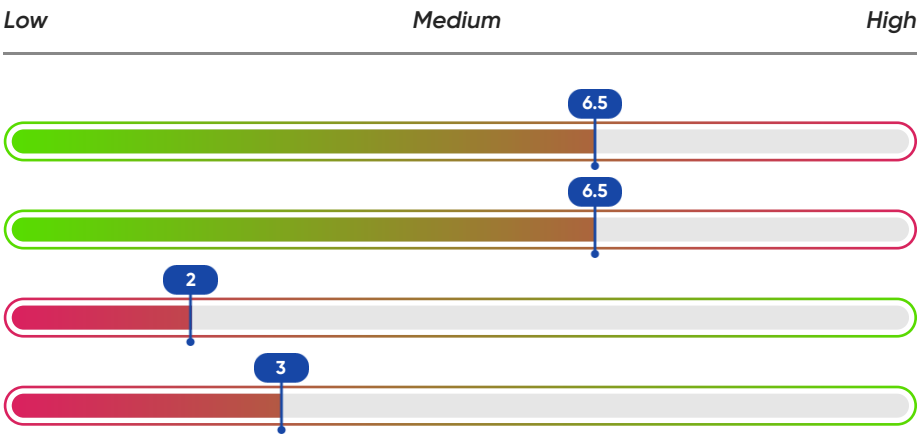
Backed by the latest research, this report will provide you with insights on how your genes can affect your detox ability, and importantly, the actions you can take to stay healthy given your genetic tendencies.

For instance, you'll learn about things like which toxins you might be more sensitive to and should thus stay away from; how much coffee you can drink in order to gain the health benefits; whether you're susceptible to the "Asian flush"; or how to minimize your risk of certain cancers if you have a faulty enzyme that impairs your body's ability to metabolize carcinogens.

Keep reading to find out more.

OVERVIEW

U-DETOX



Asian flush — Harmful variant found

Food and Drink Sensitivity

11 genes analyzed	3 harmful variants	Top 37% of Asian population

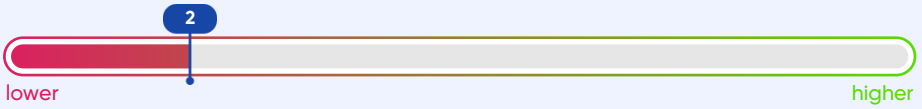
You might have a relatively higher sensitivity towards food and drink than others. Harmful yet common variants in Asian populations causing lactose intolerant are detected in your genotype. To fit your genes, a daily minimum amount of milk is possible, yet a large amount can lead to gas, bloating or diarrhea. As you are also prone to gluten sensitivity, you should consider to cut down gluten foods (e.g., wheat, barley, rye) if often have symptom like "foggy mind".

Emotional Eating

11 genes analyzed	1 risk variant	Top 37% of Asian population

You might have a relatively higher emotional eating tendency than others. Harmful variants in a food intake gene increase your risk of overeating, especially when you are stressed. You also tend to eat between meals more often than others. To control your snacking behavior, you can snack on healthy foods in small portion. For your reference, non-animal sources like beans, tofu and legumes are the good protein sources.

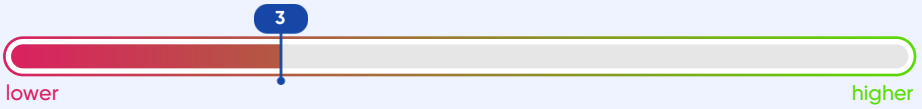
Detoxification Ability



17 genes analyzed	1 risk variant	Bottom 11% of Asian population

Your detoxification ability is significantly lower than average. Environmental carcinogens can leverage your risk of cancer due to a defective anti-cancer detox enzyme gene. In addition, harmful variants also lessen your ability to break down toxins. You should consult with doctor about consuming types of edible herbs including raspberry leaf and fennel leaf. Moreover, to counter this effect, people with your genotype should avoid smoking and second-hand smoking.

Caffeine Metabolism



8 genes analyzed	4 harmful variants	Bottom 25% of Asian population

You are slightly sensitive with caffeine. Your caffeine metabolism is slow, which makes you more prone to the negative impacts of caffeine on your heart and neural system. You should drink less than 200 mg per day.

RECOMMENDATIONS

- It is possible that you can still drink milk or have dairy foods. However, if you consume a large amount of milk, e.g. one large cup of milk a day, your body cannot produce enough lactase to digest that may results in gas, bloating or diarrhea. You are highly recommended to limit your consumption of milk and milk-products. You may also consider to have lactose-free milk.

- Some people who are lactose intolerant can consume a lot of dairy while others can only consume a tiny little bit before they start experiencing diarrhea. Either way, you may want to consider taking a lactase enzyme supplement before, or with, the dairy you consume in order to ease the signs and symptoms of any intolerance. This is important, because you don't want to stop the consumption of all dairy as it contains calcium and other nutrients that are important for your health.

- Celiac disease is an autoimmune disorder cause by the consumption of gluten-containing foods in genetically predisposed individuals. People with this disorder have mutations in immune system genes, like the HLA-DQA1 gene. This gene encodes a molecule on the surface of white blood cells that senses the presence of gluten and triggers an inflammatory reaction in response to the gluten. Luckily, you don't have this mutation. Therefore, if you have digestive signs and symptoms like diarrhea, bloating, or abdominal pain, then it's likely caused by another disorder.

- If you frequently face with symptoms like "foggy mind", you should consider to cut down the gluten intake. Please note that, if you are worried and decide to get a blood test for celiac disease, you need to do the blood test before completely quitting gluten. Quitting gluten before you get the blood test for celiac disease might backfire. By the time you get tested, your immune system might not be making the antibodies that the test checks for.

- People with higher snacking behavior are more likely to gain weight if they are not aware that they may eat more than their bodies expect. Sometimes, it is hard to control snacking behavior. So, you may consider to snack on balanced foods, containing healthy fats, lean protein, fiber and low glycemic index carbohydrates, in small portions, throughout the day. That can help to mitigate snacking behavior and reduce total caloric intake.

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FOOD AND DRINK SENSITIVITY

11 genes analyzed

2 detailed results

2 personalized recommendations

WHAT IS **FOOD AND DRINK SENSITIVITY**?

Food intolerance, also known as non-IgE mediated food hypersensitivity or non-allergic food hypersensitivity, refers to difficulty in digesting certain foods. It is important to note that food intolerance is different from food allergy. Food allergies trigger the immune system, while food intolerance does not. Some people suffer digestive problems after eating certain foods, even though their immune system has not reacted.

Some people have genetic variations in their DNA that result in difficulty digesting or breaking down certain types of foods. In this, we cover the the two most important food intolerances:

- Gluten Intolerance
- Lactose Intolerance

Prevalence of primary lactase deficiency per population	
Hispanics	50% - 80%
Blacks and Ashkenazi Jewish	60% - 80%
Asians and American Indians	~ 100%

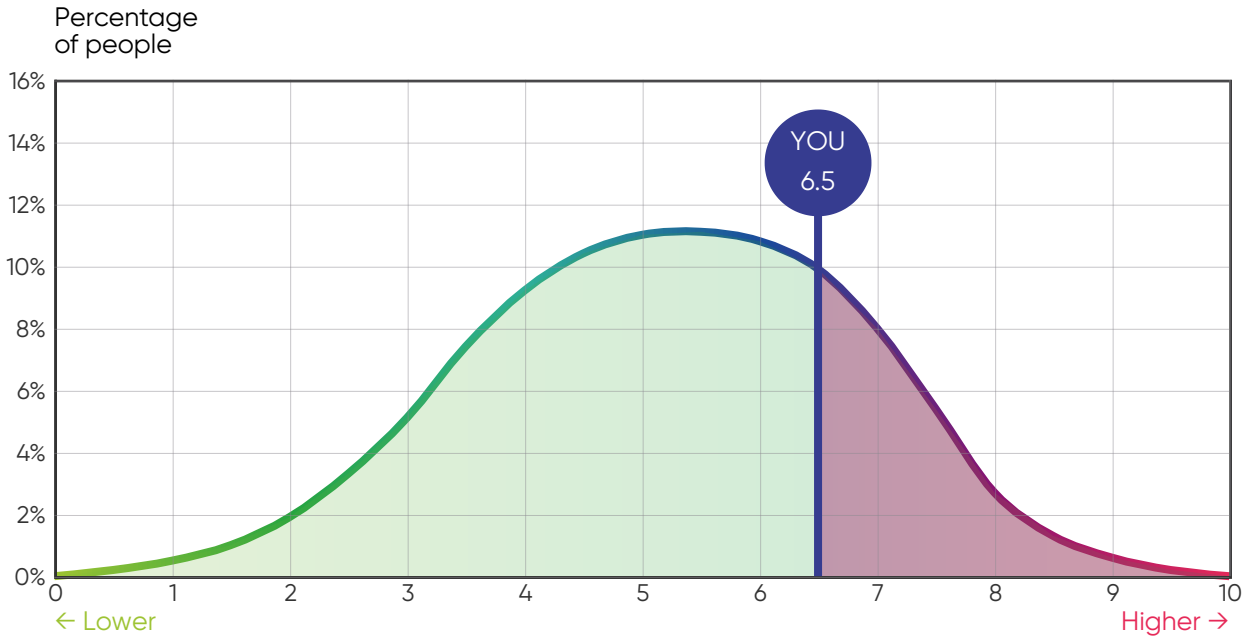
Source: National Academy of Sciences. Institute of Medicine.

Gluten is a protein found in wheat, rye, and barley - grains that are in many everyday foods. Most of us eat food with gluten with no trouble. But for some people, eating gluten can cause a reaction in their bodies. Someone who has this problem has celiac disease.

Lactose intolerance is a digestive disorder caused by the inability to digest lactose, the main carbohydrate in dairy products. It can cause various symptoms, including bloating, diarrhea and abdominal cramps. People with lactose intolerance don't make enough of the enzyme lactase, which is needed to digest lactose.

Lactase deficiency can be caused by variations in your genes, by certain conditions that trigger an intolerance to lactose (e.g. medications, surgery, etc), or it can develop as your diet is less and less dependent on dairy products. The later is known as primary lactase deficiency, and it is the most common type of lactose intolerance in the world, accounting for ~70% of cases. The exact numbers vary per population, but the prevalence in Asians and American indians is almost 100%. If you are lactose intolerant, remember to increase your calcium and vitamin D intake from other food sources or supplements to maintain healthy bones and strong teeth.

SUMMARIZED ANALYSIS



How your Food And Drink Sensitivity compares to the Asian population.

37% higher than average.
You are likely lactose intolerant, i.e. having decreased ability to digest milk products.

Top 37% of Asian population.
Lactose intolerance is a fairly common problem in Asian populations.

What does this tell you?

Slightly lactose intolerant, linked to the lactose digestion gene
You carry a mutation in the MCM6 gene that gradually decreases your ability to digest lactose. This mutation is very common in Asian populations.

Slightly susceptible to gluten sensitivity, linked to the HLA gene
Your HLA gene indicates that you may be sensitive to gluten. Gluten is a protein found in wheat, barley, rye, and spelt.

RESULTS & RECOMMENDATIONS

OVERALL

You might have a relatively higher sensitivity towards food and drink than others. Harmful yet common variants in Asian populations causing lactose intolerant are detected in your genotype. To fit your genes, a daily minimum amount of milk is possible, yet a large amount can lead to gas, bloating or diarrhea. As you are also prone to gluten sensitivity, you should consider to cut down gluten foods (e.g., wheat, barley, rye) if often have symptom like "foggy mind".

Slightly lactose intolerant, linked to the lactose digestion gene

- *Lactose, a sugar in milk, is broken down by the enzyme lactase which your bodies produce in the small intestines. For some people, the production of the lactase enzyme stops when they become an adult, driven by a genetic variation in the MCM6 gene. Like most of Asian people, you carry this mutation. This means that you are genetically predisposed to not be able to digest larger quantities of milk.*
- *It is possible that you can still drink milk or have dairy foods. However, if you consume a large amount of milk, e.g. one large cup of milk a day, your body cannot produce enough lactase to digest that may results in gas, bloating or diarrhea. You are highly recommended to limit your consumption of milk and milk-products. You may also consider to have lactose-free milk.*

Slightly susceptible to gluten sensitivity, linked to the HLA gene

- *Your HLA makes your body more sensitive to gluten. Gluten sensitivity is different from celiac disease, an immune disease in which people can't eat gluten because it will damage their small intestine. Gluten sensitivity shares many symptoms with celiac disease, such as headache, "foggy mind," joint pain, and numbness in the legs, arms or fingers. Symptoms typically appear hours or days after gluten has been ingested. However, it does not damage the small intestine like celiac disease.*
- *If you frequently face with symptoms like "foggy mind", you should consider to cut down the gluten intake. Please note that, if you are worried and decide to get a blood test for celiac disease, you need to do the blood test before completely quitting gluten. Quitting gluten before you get the blood test for celiac disease might backfire. By the time you get tested, your immune system might not be making the antibodies that the test checks for.*

THE SCIENCE BEHIND

We analyzed 11 genes to correctly determine the genetic condition of your Food And Drink Sensitivity. Notable among these are:

MCM6

Result: CC (harmful)

Impact to your Food And Drink Sensitivity: MEDIUM HIGH

The MCM6 gene provides instructions for making part of the MCM complex, a group of proteins that functions as a helicase. A specific DNA sequence within the MCM6 gene called a regulatory element helps control the activity (expression) of a nearby gene called LCT. The LCT gene provides instructions for making an enzyme called lactase. This enzyme helps to digest lactose, a sugar found in milk and other dairy products. Lactose intolerance in adulthood is caused by gradually decreasing expression of the LCT gene after infancy, which occurs in most humans.

People with CC variant are slightly lactose intolerant, linked to the lactose digestion gene.

HLA-DRA

Result: TG (harmful)

Impact to your Food And Drink Sensitivity: MEDIUM HIGH

HLA-DRA is one of the HLA class II alpha chain paralogues. This class II molecule is a heterodimer consisting of an alpha and a beta chain, both anchored in the membrane. It plays a central role in the immune system by presenting peptides derived from extracellular proteins. The histocompatibility complex gene group provides 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 proteins made by foreign invaders such as viruses and bacteria.

People with TG variant are slightly susceptible to gluten sensitivity, linked to the HLA gene.

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EMOTIONAL EATING

11 genes analyzed

2 detailed results

2 personalized recommendations

WHAT IS **EMOTIONAL EATING**?

Emotional eating is when people use food as a way to deal with feelings instead of to satisfy hunger. Emotional eating can affect weight, health, and overall well-being. Understanding what drives emotional eating can help people take steps to change it.

Our genes affect not just how we metabolize food, but also our eating behavior. LEPR gene makes a protein called leptin receptor, which is in charge of regulating our appetite by telling our brains when we are full. Similarly, there are other proteins in our bodies that tell our brains when we are hungry, therefore increasing our appetite. We could consider this as a genetic switch for our bodies to let us know when our energy levels need to be replenished.

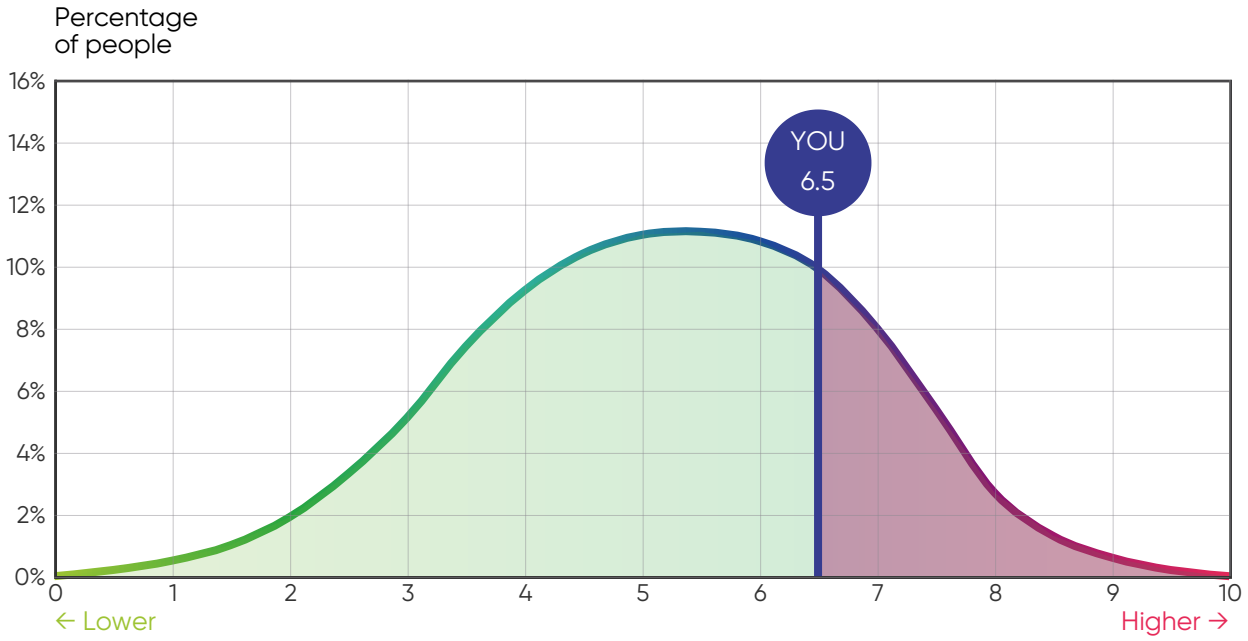
Snacking, in moderation, can be a good thing. It is believed that snacking between meals may increase your metabolism, help you maintain energy levels throughout the day, and prevent you from overeating during main meals. That said, remember to consider the number of calories and nutritional values of any snacks you may consume.

It is important to note that although some genetic variations may make you more or less susceptible to certain eating behaviors, your ultimate eating behavior is also affected by other environmental and metabolic factors. We cannot change our DNA makeup, but learning more about our individual genetic variations provides us with powerful information to manage those environmental factors that are under our control to change. Thus, if you find yourself eating too many chocolates, you can blame your genes, but you must remember that you are in control of how much you eat.

Your level of taste sensitivity may also affect your dietary behavior. For example, people with low sensitivity to sweets may consume more sugary foods than other people because they require larger concentrations of sweet foods in order to perceive the same degree of sweetness. If you give in and cannot resist your cravings for sugary foods, your blood sugar levels will be elevated, which translates into more work for your cells to release insulin to control your blood sugar.

Being able to control your eating behavior is important not just because of your weight, but also because of your metabolic health. Overeating in general is not a good thing; both what you eat and how much you eat have a great impact on your health. Across multiple ethnic groups, overeating has been shown to be associated with mortality rate, cardiovascular disease, and cancer risk.

SUMMARIZED ANALYSIS



How your Emotional Eating compares to the Asian population.

16% higher than average.
Your genetic test results show that you are highly associated with emotional eating.

Top 37% of Asian population.
You may be susceptible to unintentional eating that puts you at higher risk of weight gain, especially when you are emotionally distressed.

What does this tell you?

May eat frequently between meals, linked to appetite regulator gene
Your genetic profile indicates you may be prone to snack frequently, i.e. you may unintentionally eat between meals. This may be linked to an appetite regulator gene.

Increased risk of excessive eating, linked to a defect in a food intake gene
Unfortunately, you have a mutation in a gene that regulates the intake of food. This mutation is associated with excess eating, especially when you are stressed.

RESULTS & RECOMMENDATIONS

OVERALL

You might have a relatively higher emotional eating tendency than others. Harmful variants in a food intake gene increase your risk of overeating, especially when you are stressed. You also tend to eat between meals more often than others. To control your snacking behavior, you can snack on healthy foods in small portion. For your reference, non-animal sources like beans, tofu and legumes are the good protein sources.

May eat frequently between meals, linked to appetite regulator gene

- *The LEPR gene instructs the body to make a receptor for a hormone called leptin. This receptor is found in many parts of the body, including the brain and especially the special area in hypothalamus, called the hunger center. When leptin binds to the receptor in the hypothalamus it sends a signal to the body to manage when to start eating and when to stop eating. Your version of this gene is associated with higher snacking behavior, which means you are more likely to eat between meals more frequently than others.*
- *People with higher snacking behavior are more likely to gain weight if they are not aware that they may eat more than their bodies expect. Sometimes, it is hard to control snacking behavior. So, you may consider to snack on balanced foods, containing healthy fats, lean protein, fiber and low glycemic index carbohydrates, in small portions, throughout the day. That can help to mitigate snacking behavior and reduce total caloric intake.*

Increased risk of excessive eating, linked to a defect in a food intake gene

- *The MC4R gene encodes a receptor for melanocortin, a type of hormone. When you eat, a series of events leads to the secretion of melanocortin from specialized neurons (brain cells). The melanocortin then binds to the MC4R receptor in the hypothalamus, a structure in the brain. This leads to a reduction in appetite. Our analysis shows you have a genetic mutation in your copy of this gene. This mutation is associated with overeating, especially when you are stressed.*
- *In order to ensure that you have enough melanocortin to regulate your appetite, you need to make sure you're getting enough protein in your diet. Melanocortin is a peptide hormone, after all. This means it is made from short chains of amino acids. Your body gets many important amino acids from dietary protein. Animal-based protein contains lots of fat. It is highly recommended to get protein from non-animal sources, such as beans, tofu, legumes.*

THE SCIENCE BEHIND

We analyzed 11 genes to correctly determine the genetic condition of your Emotional Eating. Notable among these are:

LEPR

Result: GG (harmful)

Impact to your Emotional Eating: MEDIUM HIGH

LEPR (Leptin Receptor) functions as a receptor for the Adipocyte (fat cell) hormone Leptin, that regulates body weight and is involved in the regulation of fat metabolism. Mutations in this gene have been associated with obesity and increased thirst and frequent urination at night. Research has shown that loss of this protein function leads to obesity and severe appetite for food in humans.

People with GG variant may eat frequently between meals, linked to appetite regulator gene.

MC4R

Result: TC (harmful)

Impact to your Emotional Eating: MEDIUM HIGH

MC4R plays an active role in the hypothalamus, the area of the brain responsible for controlling appetite and full satisfaction from a meal. When our body's energy levels are low, appetite is increased due to suppression of MC4R (by binding to a molecule called agouti-signaling peptide). Following food intake, our body sends signal to stop eating by stimulating MC4R levels by binding to a hormone called α-MSH. People with mutations in MC4R tend to gain weight from early childhood, as well as increased fat mass leading to higher BMI throughout life.

People with TC variant have increased risk of excessive eating, linked to a defect in a food intake gene.

DETOXIFICATION ABILITY

17 genes analyzed

2 detailed results

2 personalized recommendations

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WHAT IS **DETOXIFICATION ABILITY**?

Our bodies need to metabolize food in order to obtain energy and nutrients. However, we are continuously exposed not only to healthy fruits and vegetables, but also to toxins that may harm us. These toxins can be generated inside our bodies, as by products of biological reactions in our bodies, or they may come from foods, medical drugs, insecticide and cigarettes. Independently of the source, our bodies must find a way to fight them and get rid of these toxins. This process is called detoxification.

The first step to detoxification is to break down the toxins into smaller molecules; this usually takes place in the liver. The second step is to excrete those smaller molecules from our bodies. Some of our genes are responsible for making the proteins whose role is to eliminate such toxins. Different proteins will be in-charged of certain types of toxins. Proteins in charged of detoxification can neutralize and transform toxins to a non-harmful molecule, or transport the toxins to other parts of our bodies so they can be excreted out.

The actual method of excretion for each toxin depends on the type of toxin. Some of them may be excreted out via urine, feces, or skin. Detoxification is highly important for a healthy and functional body. Research studies show that detoxification could improve immune system, increase longevity, help with stagnant weight, and contribute with other factors.

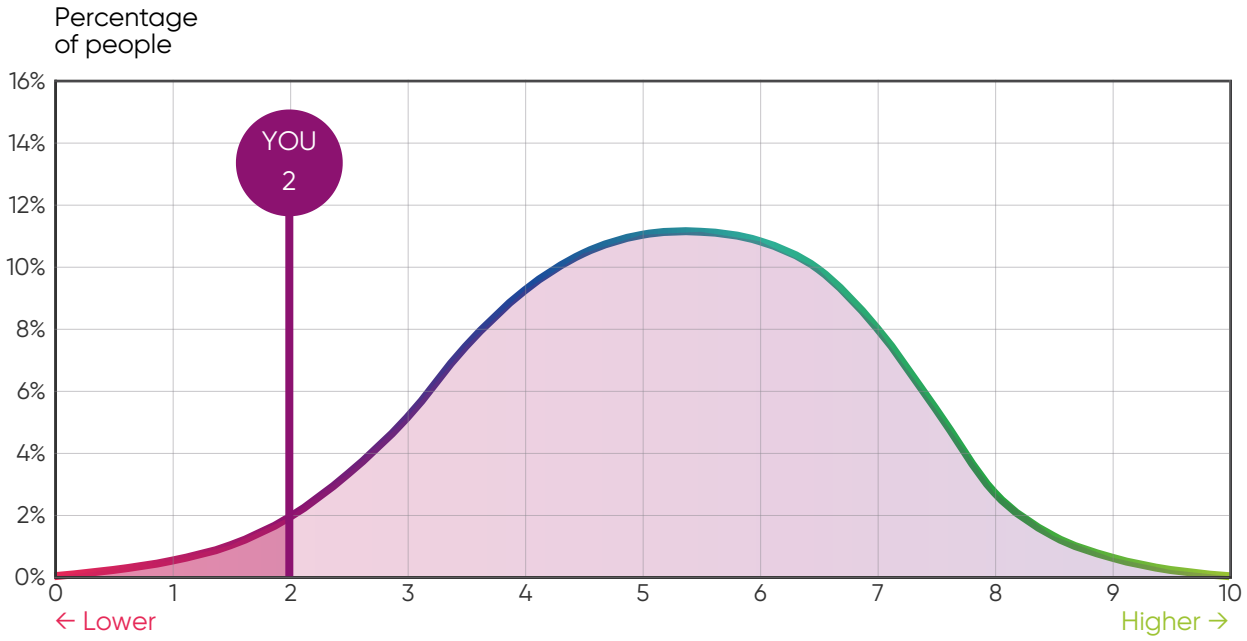
Exposure and accumulation of toxins have also been associated with several chronic diseases, such as cardiovascular disease, type 2 diabetes, and obesity. Some people may use cleansing juices and teas as a way to detox, but our genes start the detoxification process naturally for us every day. Research studies show that nutrition also helps to improve the process; there are certain foods with chemical properties that enhance our detoxification systems to work at its optimal levels.

Foods With Demonstrated Or Potential Impact On Detoxification Systems

Onion	Leek	Black raspberry
Black tea	Blueberry	Chamomile tea
Vitrus	Coffee	Peppermint tea
Ghee	Ginger	Soybean/black soybean
Green tea	Grapefruit	Pomegranate
Rosemary	Garlic	Turmeric
Fish oil	Cauliflower	Bok choy
Broccoli	Cabbage	Brussels sprouts

Source: National Academy of Sciences. Institute of Medicine.

SUMMARIZED ANALYSIS



How your Detoxification Ability compares to the Asian population.

43% lower than average.
You are likely to have lower detoxifying activity than average people.

Bottom 11% of Asian population.
Your liver may not function very effectively to detoxify toxins.

What does this tell you?

Higher risk of cancer caused by environmental carcinogens, link to a defective CYP3A gene
You have a defect in a gene that encodes an anti-cancer detox enzyme. Your version may not work very well. This is associated with a higher risk of environment-causing cancer.

Reduced ability to break down carcinogens, the toxins that cause cancers
NAT2 catalyzes the acetylation of a couple of types of carcinogens (the toxins that cause cancer) which include tobacco smoke, well-cooked meat, and exhaust fumes. You carry a harmful mutation in the NAT2 gene that makes this process less effective.

RESULTS & RECOMMENDATIONS

OVERALL

Your detoxification ability is significantly lower than average. Environmental carcinogens can leverage your risk of cancer due to a defective anti-cancer detox enzyme gene. In addition, harmful variants also lessen your ability to break down toxins. You should consult with doctor about consuming types of edible herbs including raspberry leaf and fennel leaf. Moreover, to counter this effect, people with your genotype should avoid smoking and second-hand smoking.

Higher risk of cancer caused by environmental carcinogens, link to a defective CYP3A gene

- *The CYP3A gene encodes an enzyme that metabolizes (breaks down) a lot of medications. This enzyme also neutralizes carcinogens (cancer-causing compounds). That being said, it's important for you to know that you have a mutation in this gene that is linked to a dysfunctional version of this enzyme and a higher risk of environment-causing cancer, like colorectal cancer. For woman, this mutation is also associated with a higher chance of hypertension (abnormally high blood pressure) during pregnancy.*
- *You may want to talk to your doctor about any food containing herbs you take, as some of them may decrease the activity of this cancer-fighting enzyme even further. Based on limited research, these herbal foods include milk thistle, raspberry leaf and fennel leaf.*

Reduced ability to break down carcinogens, the toxins that cause cancers

- *The NAT2 gene encodes an enzyme that helps to metabolize aromatic amines, drugs, cigarette smoke, and carcinogens. Basically, it makes specific toxins more water soluble so that they can be excreted through a process called acetylation. You carry a defective version of this gene that makes you a slow acetylators.*
- *As a slow acetylators, you should never smoke. In fact, you need to avoid second-hand smoke also, i.e. you should stay away from people when they smoke, because it increases significantly your risk of getting cancer. In addition, you need to cut back on fried meats to limit the intake of heterocyclic aromatic amines. You should replace fried meat with healthy vegetables and fruits but especially with cruciferous vegetables (broccoli, cauliflower, watercress, and cabbage).*

THE SCIENCE BEHIND

We analyzed 17 genes to correctly determine the genetic condition of your Detoxification Ability. Notable among these are:

CYP3A

Result: TT (harmful)

Impact to your Detoxification Ability: MEDIUM

CYP3A isozymes collectively comprise the largest portion of the liver and small intestinal CYP protein and they are involved in the metabolism of 45-60% of all currently used drugs. In addition to drugs, CYP3A isozymes metabolise a variety of other compounds including steroid hormones, toxins and carcinogens. It is also well known that the hepatic expression and activity of CYP3A isozymes varies from individual to individual. The involvement of this variability in harmful interactions frequently encountered in development and application of drugs that are CYP3A substrates is well documented. It has also been postulated that variable CYP3A expression could affect an individual's predisposition to cancers caused by environmental carcinogens that are metabolised by CYP3A.

People with TT variant have higher risk of cancer caused by environmental carcinogens, link to a defective CYP3A gene.

NAT2

Result: TC (harmful)

Impact to your Detoxification Ability: HIGH

The NAT2 gene encodes an enzyme that functions to both activate and deactivate arylamine and hydrazine drugs and carcinogens. Polymorphisms in this gene are responsible for the N-acetylation polymorphism in which human populations segregate into rapid, intermediate, and slow acetylator phenotypes. Polymorphisms in this gene are also associated with higher incidences of cancer and drug toxicity.

People with TC variant have reduced ability to break down carcinogens, the toxins that cause cancers.

Genetica®

CAFFEINE METABOLISM

8 genes analyzed

2 detailed results

2 personalized recommendations

WHAT IS **CAFFEINE METABOLISM**?

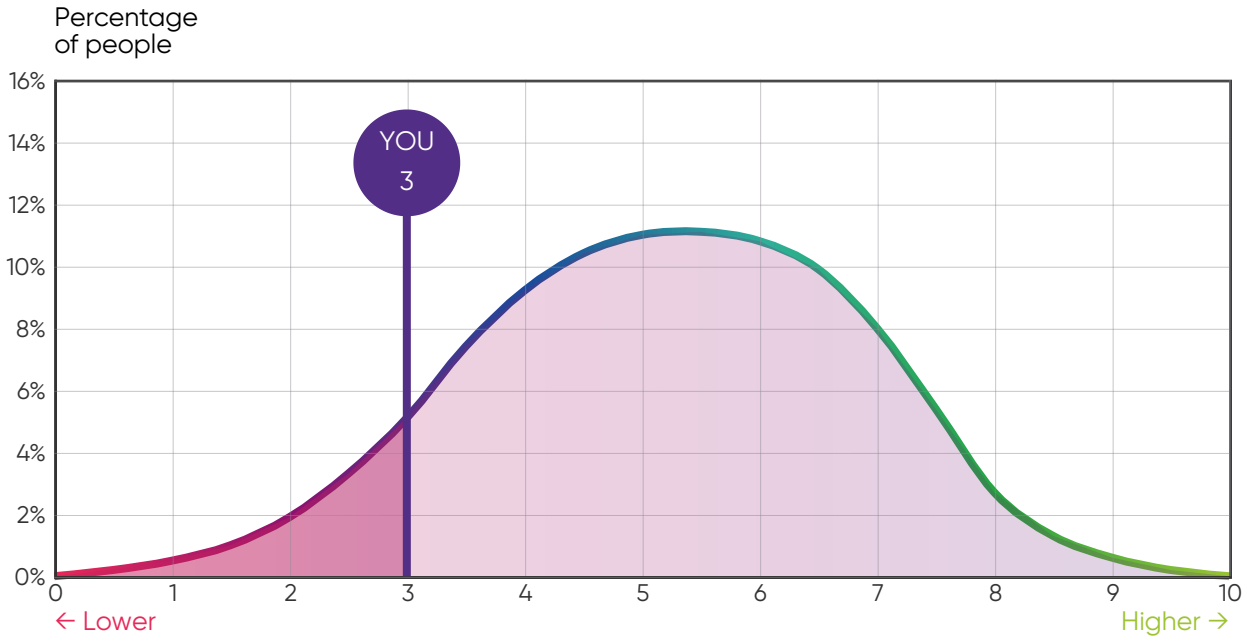
Caffeine is a naturally occurring stimulant found in coffee, tea, chocolate and used as an additive in other beverages and adjuvant analgesic in some pain medications.

The speed at which caffeine is metabolized depends on specific genes. CYP1A2 is responsible for more than 95% of the primary metabolism of caffeine.

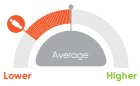
Consumption of caffeine has long been linked to anxiety. People with slow metabolism who drinks more than a cup of coffee a day (consume 200 mg) has been shown to increase the likelihood for anxiety and panic attacks.

Adenosine plays a role in the sleep-wake cycle. When adenosine binds to receptors, it signals the brain that it is time for rest or sleep. Caffeine molecules are able to bind to the brain's adenosine receptors and therefore block adenosine from binding and doing its job. For slow caffeine metabolizer, caffeine can effectively mask tiredness by blocking adenosine but it may cause long-term health side-effects to that person.

SUMMARIZED ANALYSIS



How your Caffeine Metabolism compares to the Asian population.



65% lower than average.
Slow metabolizers of caffeine have higher heart attack risk.

Bottom 25% of Asian population.
You feel the effects of caffeine much longer time than average people.

What does this tell you?

Slightly increased risk of high blood pressure
Your systolic blood pressure along with adrenaline may increase significantly after you consume caffeinated drinks.

Susceptible to anxiety from caffeine
High caffeine doses are more likely to cause anxiety and insomnia.

RESULTS & RECOMMENDATIONS

OVERALL

You are slightly sensitive with caffeine. Your caffeine metabolism is slow, which makes you more prone to the negative impacts of caffeine on your heart and neural system. You should drink less than 200 mg per day.

Slightly increased risk of high blood pressure

- *Intensive physical activities, such as exercises or hard manual labour, can naturally increase your blood pressure. Therefore, if you already have high blood pressure level, avoid caffeine before doing these.*

Susceptible to anxiety from caffeine

- *Too much caffeine can make you become easily agitated, even by trivial causes. If you already have increased anxiety or suffer from panic attacks, caffeine can make you feel worse. Limit your caffeine consumption to less than 200 mg a day.*

THE SCIENCE BEHIND

We analyzed 8 genes to correctly determine the genetic condition of your Caffeine Metabolism. Notable among these are:

CYP1A2

Result: AC (harmful)

1 in 5
people carry harmful variant

Impact to your Caffeine Metabolism: MEDIUM HIGH

CYP1A2 is involved in the metabolism of xenobiotics in the body. CYP1A2 localizes on the endoplasmic reticulum and its expression is induced by some polycyclic aromatic hydrocarbons (PAHs), some of which are found in cigarette smoke. Even though the enzyme's endogenous substrate is unknown, it is able to metabolize some PAHs to carcinogenic intermediates. Other xenobiotic substrates for this enzyme include caffeine, aflatoxin B1, and paracetamol (acetaminophen). CYP1A2 is an enzyme responsible for the metabolism of caffeine and some drugs. Expression of CYP1A2 appears to be induced by various dietary constituents. Vegetables such as cabbages, cauliflower, and broccoli are known to increase levels of CYP1A2. Lower activity of CYP1A2 in South Asians is apparently due to a diet full of these vegetables but cooked in curries using CYP1A2 inhibitory ingredients, such as cumin and turmeric. CYP1A2 also metabolizes polyunsaturated fatty acids into signaling molecules that have physiological as well as pathological activities.

People with AC variant slightly increase risk of high blood pressure with caffeine consumption.

ADORA2A

Result: TT (harmful)

1 in 10
people carry harmful variant

Impact to your Caffeine Metabolism: HIGH

ADORA2A plays a pivotal role in the development of anxiety and anxious disorders. Research data has shown that a loss of function in ADORA2 is associated with sleep disruption after caffeine consumption. The ADORA2A protein is abundant in brain (basal ganglia), cardiovascular system, immune cells, and platelets and it is a major target for caffeine. Mutations of this gene are associated with greater caffeine sensitivity, increased anxiety, and sleep impairment.

People with TT variant are susceptible to anxiety from caffeine.

Genetica®

ASIAN **FLUSH**

WHAT IS ASIAN FLUSH?

Many people of East Asian descent possess an enzyme deficiency that causes their skin to redden, or flush, when they drink alcohol. This phenomenon is called Asian Flush (or Asian Glow) and is predominantly due to an inherited deficiency in the enzyme aldehyde dehydrogenase 2 (ALDH2).

Although clinicians and the East Asian public generally know about the alcohol flushing response, few are aware of the accumulating evidence that ALDH2-deficient individuals are at a much higher risk of esophageal cancer from alcohol consumption than individuals with fully active ALDH2. This is particularly unfortunate as esophageal cancer is one of the deadliest cancers worldwide, with five-year survival rates of 15.6% in the United States, 12.3% in Europe, and 31.6% in Japan.

Research studies found that ALDH2-deficient individuals are about 6-8 times more likely to develop esophageal cancer. Therefore, If you carry the flushing mutation, alcohol could be very damaging to you.

SUMMARIZED ANALYSIS

A harmful variant found in the ALDH2 gene

We analyze the DNA extracted from your given saliva samples for the variant referred to as the Asian Flush or Asian Glow. We then assess the risks related to this variant on ALDH2 genes using research studies on this variant over people with the genetic background similar to you, to provide you with a customized report specified for your genetic results.

Result	Variant	Gene related/process
ALDH2	Nucleotide: NM_000690.4:c.1510G>A Protein: NP_000681.2:p.Glu504Lys	ALDH2/converting acetaldehyde (a toxic byproduct of alcohol in the body) into acetic acid.

The gene ALDH2 (aldehyde dehydrogenase 2 families) encodes an enzyme called aldehyde dehydrogenase. When you drink alcohol, this enzyme is needed to process and digest the alcohol and convert it's toxic byproduct (acetaldehyde) so that it can be rapidly removed from the body. People with the Asian Flush variant do not make enough of this ALDH2 functional enzyme, thus the toxic substance remains longer in the body which could lead to blushing, nausea and headache.

Many studies in East Asians have shown that people with this variant in their DNA carry a higher risk of developing cancer, especially esophageal cancer, kidney and stomach cancer. These risks are even higher in people who smoke or drink regularly. The US National Institute of Health Databases for Clinical Variants has categorized this variant as "Risk factor" which related to various types of cancers and also as "Drug response" because people with this variant do not respond well with drugs to treat Alcoholism.

If an individual has a variant, then it is more likely that their parents, siblings or children may have the same variant.

Additional genes analyzed

We also analyzed 2 other genes that are associated with Asian Flush but did not find any harmful variant.

ADH1B, ADH1C.

Other services from Genetica®

65 genes

G-Care

Foundation To Your Quality Life

Over 18 years of age

NutriCare
- Carbohydrate metabolism
- Protein metabolism
- Fat metabolism

Facts-to-Know
- Béo bụng
- Chuyển hóa affeine
- Nguy cơ mất ngủ

HealthCare
- Breast Cancer or Prostate Cancer
- Stomach Cancer
- Asian Flush

Personality
- Belly fat
- Caffeine sensitivity
- Insomnia tendency

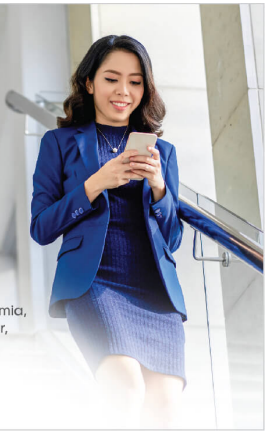
PhysiCare
- Endurance ability
- Power performance
- Cardiorespiratory fitness

300 genes

G-Pro

Unearth Your Potentials

Over 18 years of age



Mind & Spirit
- Personality
- Behavior tendency
- Cognitive ability
- IQ, EQ
- Educational attainment
- Language ability
- Math ability
- Music ability

Nutrition
- Protein, Fat, Carbohydrate metabolism
- Vitamin requirements
- Liver Detoxification
- Food and Drink sensitivities
- Eating behavior
- Cardiometabolic risk
- Diabetes risk scores
- Cardiometabolic health

Fitness
- Endurance ability
- Power performance
- Cardiorespiratory fitness
- Recover ability
- Tendency to get injuries
- Weight Management Difficulty
- Tendon/ Ligament strength
- Exercise benefit

Resting
- Insomnia tendency
- Belly fat
- Caffein metabolism

Health

Up to 20 common cancers for both genders
- Breast, Bladder, Brain, Cervical,
- Colorectal, Colon, Esophageal,
- Uterine, Kidney, Stomach, Leukemia,
- Liver, Lung, Pancreatic, Testicular,
- Prostate, Ovarian, Skin
- Pheochromocytoma and
- Paraganglioma

125 genes

G-Kid Care

Foundation For Child's Development

From 0 to 18 years of age

Behavioural tendencies
- Extraversion
- Conscientiousness
- Emotional instability

Macronutrient metabolism
- Carbohydrate metabolism
- Fat metabolism
- Protein metabolism

Health risk
- Obesity risk score

Intelligence
- IQ
- EQ
- Cognitive ability

300 genes

G-Kid Pro

Reaching An Optimal Future

From 0 to 18 years of age

Mind
- IQ
- EQ
- Educational attainment
- Cognitive ability
- Math ability
- Language ability
- Music ability
- Fitness potentials

Body
- Vitamin requirement
- Mineral requirement
- Macronutrients requirement
- Eating behavior
- Sweet and bitter taste
- Health risk: Obesity Cardiometabolic/ Diabetes risk.

Spirit
- Personality
- Behavior tendency

Other services from Genetica®

97 genes

G-Health

Access Risk Of Hereditary Diseases

Over 18 years of age

Up to 20 common cancers for both genders

- Breast
- Bladder
- Brain
- Cervical
- Colorectal
- Colon
- Esophageal
- Uterine
- Kidney
- Stomach
- Leukemia
- Liver
- Lung
- Pancreatic
- Testicular
- Prostate
- Ovarian
- Pheochromocytoma
- and Paraganglioma
- Skin

48 genes

G-Autism

Hereditary Autism Risk Screening

The G-Autism report will unveil the genetic risk of an individual via:
- Detect any known pathogenic or likely pathogenic mutations associated with ASD.
- Evaluate the Autism Risk Score: A polygenic score which indicates the user's increased risk of autism.

Everyone will benefit from this report. However, young children who display symptoms of autism are especially advised to take the genetic test.

This report will provide you:
- In-depth knowledge about gene-related causes of ASD.
- Information that enables best-suited personalized therapy and developmental care in regard to the user's risk of autism.

32 genes

G-Immunity

Hereditary Susceptibility To Respiratory Viral Infection Screening

Traits tested:
- SARS-CoV
- Influenza
- Acute Respiratory Distress Syndrome (ARDS)

Everyone will benefit from this report.

Benefits:
- Provide users the genetic information about their susceptibility to viral infection.
- Mainly focusing on respiratory viral infections at this time.
- Provide actionable guidelines and recommendations based on research studies from epidemics that have happened, such a SARS epidemic, ...

73 genes

G-Stroke

Hereditary Stroke Screening

The G-Stroke report will provide the following information:
- Pathogenic or likely pathogenic mutations that increase risk of strokes (ischemic stroke, hemorrhagic stroke).
- Stroke Risk Score: a polygenic score that indicates the patient's increased risk of stroke.

Everyone will benefit from this report.

Benefits:
- In-depth knowledge about gene-related causes of stroke.
- Information to make informed medical and lifestyle decisions in regard to the user's risk of stroke.
- Personalized recommendations for preventive and monitoring options.

28 genes

G-ADHD

Hereditary ADHD Risk Screening

The G-ADHD report will provide the following information:
- Pathogenic or likely pathogenic mutations that increase risk of ADHD.
- ADHD Risk Score: a polygenic score that indicates the user's increased risk of ADHD.

Young children and teenagers are especially advised to take the genetic test.

Benefits:
- In-depth knowledge about gene-related causes of ADHD.
- Information to help make informed medical and lifestyle decisions in regard to the user's risk of ADHD, as well as available treatment options.
- Helpful and personalized recommendations.

DISCLAIMERS

Gene Friend Way provides genetic assessment services for research or investigational use. Gene Friend Way does not provide any direct medical advice to individual patients. Genetic information must always be considered in conjunction with other information about your health such as lifestyle, family history, risk factors, biomedical data, diet, nutrition and physical activity among other factors.

Gene Friend Way's role is limited to providing results of genetic test and providing a broad set of general recommendations. More detailed recommendations that may be specific to you are to be made by qualified Professional Practitioners only. General guidelines provided in our report are for information purpose only and are meant to aid your Professional Practitioner to render the relevant professional or medical advice and treatment. While assessing your genetic parameters and providing the report and recommendations, we do not consider your past or existing health conditions and or any medication taken by you (either in the past or currently), even if you may have provided us with such information. Our report and the recommendations therein are to be acted upon in consultation with a medical or other health and wellness professional practitioner.

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Thank you,

It is our honor to be able to contribute
to your healthy and happy life.

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