



Maximize Your Weight Management Potential.

**EDUCATIONAL REFERENCE MATERIAL ONLY.
NOT SPECIFIC TO YOUR GENOTYPE.**

CATEGORY:

NUTRITION

VERSION:

1.3.2

LAST UPDATE

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This report is intended as supplement material to assist the reader in understanding their DNA results published in **GENIXPRO™ HEALTH SCREENING** report, and obtained by testing a sample for response to a selection of key genes that are associated with health, diet and fitness. This report is intended as educational information, and is not intended to be used solely by the reader/user/patient/consumer in medical decision-making without the prior consultation with a licensed health care professional. Any assertions or recommendations in the report as to exercise programs or diet, whether specific or general, are based on following assumptions:

1. That you are in a good state of health and do not have any medical problems that you are aware of;
2. That you have not had any recurring illness in the past 12 months;
3. That no medical practitioner has ever advised you not to exercise;
4. That you are not on any prescribed medication that may impact either your ability to exercise safely or your diet;
5. That you do not have any dietary restrictions or food allergies; and
6. That there is no other reason why you should not follow the assertions or recommendations in this report.

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AREN'T WE ALL DIFFERENT?

Anyone who has ever tried losing weight will have experienced the dizzying array of diets available, marketing messages and often conflicting advice that they advocate . When starting out on a new weight management program it can be a confusing prospect - the latest "Guaranteed Results" diet fad in the media often changes from week to week! Even if the latest craze does actually help you lose body fat for a month or two - will it work long term? Most fad diets will not, and this is why successful weight management is defined as keeping the pounds off for at least 12 months. Following a personalized, DNA-based diet has been shown in studies to be a powerful factor in maintaining long term, sustainable weight management goals.

IT IS WELL DOCUMENTED THAT GENETICS ACCOUNTS FOR 40 TO 70% OF AN INDIVIDUAL'S PREDISPOSITION TO OBESITY.

You may have found that a diet that works for someone else is perhaps not so effective for you, or vice-versa. This is a result of a number of factors, from personal preference to lifestyle, but research has also shown that our genetics play an important role in identifying the most effective diet and weight-loss plan for our own bodies. If you are thinking about starting a weight loss program or just maintaining a healthy diet, the objective of this report is to empower you with personalized information that may help you modify your behavior. The reality is, **there is no "One Size Fits All" nutrition plan**, so using genetics we hope to help guide the correct path for *your* body to identify the diet type that works best for you. Lets get started...shall we?

SENSITIVITY: When we refer to your individual sensitivity in this report, we are referring to your body's individual reaction to key macronutrient groups. Depending on your personal genetic profile you may receive a different amount of energy per calorie of both refined carbohydrates and saturated fat, compared to the average. This is important to understand when preparing your diet plan so you can optimize your intake of these two food groups for the best possible results.



HOW TO INTERPRET THIS REPORT?

The genetic markers and studies selected for this GENIXPRO™ report represent the best and most recent genetic research in nutrition and weight-related health conditions. For each key marker in the report, we analyze a selection of genetic variants. The variant you hold is your genotype, and depending on which variation you possess we can report on the scientific strength of its association with each of the GENIXPRO™ markers. Further details are provided in the [“Science Behind The Story”](#) section.

Some research can be described as stronger than others based on the size of the population studied and whether the outcome has been replicated. Due to the current state of scientific research on the genetics of fitness and nutrition, most of the studies referenced in your report are based on individuals of Caucasian ethnicity. While we all have the same genes, there are genetic and non-genetic factors in different ethnicities that might yield different outcomes for non-Caucasian/ Asian population.

Your report is categorized in 6 sections with multiple traits (or conditions) classified within each. Details for each trait include a brief description of the trait, assessment categories and Call-to-Action recommendations on nutrition and supplements based on your DNA assessment, Clinical findings and Lifestyle information you’ve shared earlier. The appendix section includes details of all genes tested, their scientific significance, and a star system to rate the strength of the research evidence for the genetic marker and the associated genotype result.

CALL-TO-ACTION RECOMMENDATIONS

SECTION	INTERPRETATION
Assessment Categories	A holistic assessment based on the gene(s) tested and our observation summary for the trait assessed.
Nutrition Recommendations	Based on the assessment, suggested diet recommendation.
Supplement Recommendations	Based on the assessment, suggested diet and supplements (if needed).

NUTRITION


DIET AND METABOLISM 

EATING BEHAVIOR 

DETOXIFICATION | ANTIOXIDANTS 

VITAMINS | MINERALS 


FOOD SENSITIVITY 


CARDIOVASCULAR HEALTH 


FITNESS

 FITNESS | EXERCISE

 MUSCLE CHARACTERISTICS

 INJURY SUSCEPTIBILITY

 BONE AND JOINT HEALTH

 BODY AND WEIGHT

 LIFESTYLE TRAITS

Studies have shown a link between genetics and human metabolism, and how people respond to exercise for weight loss and other health benefits. A few examples of this link include the ACE and ACTN3 genes and the association with elite athlete status, as well as the LPL gene and its connection to the loss of body fat in response to exercise.

REMEMBER: YOUR GENES CANNOT CHANGE, BUT YOUR LIFESTYLE CAN. The earlier we act, the better. This is why we consider the two together; and by identifying and analyzing your unique genetic characteristics, you may now personalize your training, diet and lifestyle choices to match your individual needs in achieving your goals and better results. Faster. Together.

From your DNA analysis, we provide unique scientific insights in to the following key areas in relation to nutrition and diet:-



DIET AND METABOLISM

Should you be on a Low Carb, Low Fat, Mediterranean or Balanced diet? What are your daily calorie needs and PCF ratio?



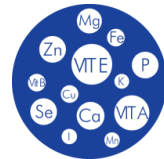
EATING BEHAVIOR

Find out if you are genetically more prone to snacking, over-eating or satiety impairment (i.e. having difficulty feeling full)



DETOXIFICATION | ANTIOXIDANTS

Learn about your body's actual biological process in the liver. Identify your anti-aging antioxidant requirements. Omega 3 & 6 needs.



VITAMINS | MINERALS

Vitamin B6, B12, Folate, A, D, E requirements. Calcium, Choline, CoQ10 deficiency



FOOD SENSITIVITY

Are you sensitive to caffeine, bitter taste, salt or alcohol. Lactose or gluten intolerant?



CARDIOVASCULAR HEALTH

Are you at genetic risk of Elevated LDL Cholesterol, Triglycerides, Blood Sugar or Decreased HDL



DIET AND METABOLISM

TRAIT	SAMPLE ASSESSMENT
OPTIMAL DIET TYPE	LOW SATURATED FAT DIET
LOW CARB DIET EFFECTIVENESS	SLIGHTLY EFFECTIVE
LOW SATURATED FAT DIET EFFECTIVENESS	EFFECTIVE
MEDITERRANEAN DIET EFFECTIVENESS	EFFECTIVE
PROTEIN RESPONSE	INCREASED BENEFIT
RESPONSE TO POLYUNSATURATED FATS	NORMAL BENEFIT
RESPONSE TO MONOUNSATURATED FATS	NORMAL BENEFIT



EATING BEHAVIOUR

TRAIT	SAMPLE ASSESSMENT
SNACKING TENDENCY	INCREASED
SATIETY	DIFFICULTY FEELING FULL
EMOTIONAL EATING TENDENCY	MORE LIKELY
SWEET TASTE PREFERENCE	MORE LIKELY
BITTER TASTE PERCEPTION	NON-TASTER



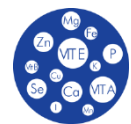
DETOXIFICATION | ANTIOXIDANTS

TRAIT	SAMPLE ASSESSMENT
DETOXIFICATION ABILITY	INTERMEDIATE
ANTIOXIDANT REQUIREMENT	MODERATE NEEDS
GLUTATHIONE REQUIREMENT	HIGHER NEEDS
COQ10 REQUIREMENT	NORMAL NEEDS



FOOD SENSITIVITY

TRAIT	SAMPLE ASSESSMENT
CAFFEINE SENSITIVITY	MODERATE SENSITIVITY
ALCOHOL SENSITIVITY	NORMAL SENSITIVITY
LACTOSE INTOLERANCE	MORE LIKELY
SALT SENSITIVITY	HIGHER SENSITIVITY
GLUTEN SENSITIVITY	NORMAL SENSITIVITY
HISTAMINE AND LECTIN SENSITIVITY	NORMAL SENSITIVITY



VITAMINS | MINERALS

TRAIT	SAMPLE ASSESSMENT
VITAMIN A REQUIREMENT	HIGHER NEEDS
VITAMIN B2 REQUIREMENT	NORMAL NEEDS
VITAMIN B6 REQUIREMENT	HIGHER NEEDS
FOLATE (VITAMIN B9) REQUIREMENT	MODERATE NEEDS
VITAMIN B12 REQUIREMENT	MODERATE NEEDS
VITAMIN C REQUIREMENT	MODERATE NEEDS
VITAMIN D REQUIREMENT	HIGHER NEEDS
VITAMIN E REQUIREMENT	NORMAL NEEDS
VITAMIN K REQUIREMENT	HIGHER NEEDS
CALCIUM REQUIREMENT	MODERATE NEEDS
MAGNESIUM REQUIREMENT	MODERATE NEEDS
IRON REQUIREMENT	MODERATE NEEDS



CARDIOVASCULAR HEALTH

TRAIT	SAMPLE ASSESSMENT
ELEVATED LDL CHOLESTEROL	INCREASED LIKELIHOOD
DECREASED HDL CHOLESTEROL	TYPICAL LIKELIHOOD
ELEVATED TRIGLYCERIDES	INCREASED LIKELIHOOD
ELEVATED BLOOD SUGAR	TYPICAL LIKELIHOOD
DECREASED ADIPONECTIN LEVELS	INCREASED LIKELIHOOD
METHYLATION	AVERAGE RISK
DECREASED OMEGA-3 AND OMEGA-6	TYPICAL



DIET AND METABOLISM

PERSONALIZE YOUR DIET WITH GENETICS!

The way we eat, how our bodies process foods, and our overall health are impacted by our genetics. Scientific studies have shown that genetics can also be important for diet effectiveness. Your results have been calculated to determine the best diet likely to help you optimize your metabolism, lose weight and improve your health.

DIET AND METABOLISM	
TRAIT	SAMPLE ASSESSMENT
OPTIMAL DIET TYPE	LOW SATURATED FAT DIET
LOW CARB DIET EFFECTIVENESS	SLIGHTLY EFFECTIVE
LOW SATURATED FAT DIET EFFECTIVENESS	EFFECTIVE
MEDITERRANEAN DIET EFFECTIVENESS	EFFECTIVE
PROTEIN RESPONSE	INCREASED BENEFIT
RESPONSE TO POLYUNSATURATED FATS	NORMAL BENEFIT
RESPONSE TO MONOUNSATURATED FATS	NORMAL BENEFIT

OPTIMAL DIET TYPE

LOW CARB DIET

Non-starchy vegetables, high quality proteins and healthy fats

LOW SATURATED FAT DIET

Lean proteins, fiber-rich vegetables, grains and fruits, and healthy fats

BALANCED DIET

Balance of healthy fats, carbohydrates and proteins

MEDITERRANEAN DIET

Fish, low glycemic, high-fiber vegetables, fruits, grains and legumes

GENES TESTED

PPARG, ADRB2, ADRB3, FABP2, ADIPOQ, APOA2, FTO, KCTD10, LIPC, MMAB, and more...

Your diet has been recommended after analyzing several genetic variants associated with how people respond to the different macronutrients (Proteins, Fats and Carbohydrates) in their diet. Your genetic risk profiles discussed in the Cardiovascular Health section of this report were also evaluated to determine your recommended diet.

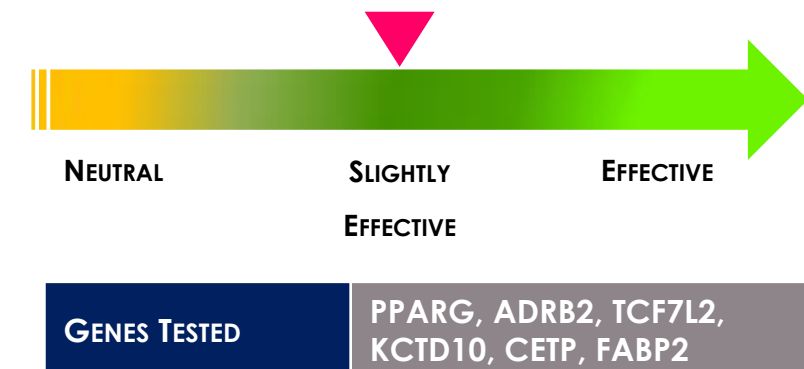
Together, your genetic results suggest which one of the following diets may be best for you: Low Fat, Low Carb, Mediterranean or a Balanced Diet. This recommendation is based on an overall measure of the potential effects of your combined genotype on aspects such as carbohydrate metabolism and assimilation, short term glucose fluctuations and longer term insulin sensitivity. Review your matching diets for examples of popular diet plans that match your genetic recommendation. It is highly recommended to discuss any change in your diet plan with your health care provider. A carbohydrate-controlled diet plan focuses on non-starchy vegetables, fat, as well as foods rich in protein. Regardless, focus on consuming a variety of strongly colored fruits and vegetables, whole grains such as oatmeal, whole-wheat bread or pasta, corn tortillas, quinoa and spelt. Maintain proper amount of dairy in your diet with milk in liquid form and plain, unflavored yogurt. For fats and oils, it's best to choose vegetable fats and to minimize your intake of animal fats as well as solid and trans fats, such as stick margarine and coffee creamer.

LOW CARB DIET EFFECTIVENESS

Individuals with genetic variations in several genes associated with obesity, insulin sensitivity, and elevated LDL (bad) cholesterol, are more sensitive to carbohydrates in their diet.

Your assessment (**EFFECTIVE OR SLIGHTLY EFFECTIVE**) may be associated with weight loss or other health benefits from a diet lower in carbohydrates. If so, you're advised to consume a maximum of **40%** of your daily calories through carbohydrates. Aim for a daily Glycemic Load maximum of **80**.

ASSESSMENT CATEGORIES



There are two kinds of carbohydrate - **SIMPLE**, which are broken down quickly by the body and are in foods like sugar, white bread and pastas, and **COMPLEX**, such as brown rice or quinoa, which are broken down into glucose more slowly. When experts talk about carbs being “bad”, it’s mainly the first category they’re discouraging – there’s merit to consuming the second category of carbs. When the body digests carbs, it breaks both kinds down into a sugar called glucose. When glucose is released too quickly it disrupts the body’s blood sugar level, which can then be harmful to your health over the long term, and dramatically affect your ability to manage weight effectively. Most refined and processed foods should be avoided in order for healthier, nutrient-dense carbs to fit into your daily intake. The glycemic index is a simple and valuable tool that you can use to help choose the right carbohydrate foods to keep blood sugar levels stable. Refer the [“Science Behind The Story”](#) section for more details.

A typical breakdown of a low-carb diet comprises 35-40% carbs, 25-35% protein and 25-30% fat. Consult a nutritionist or dietitian to ensure nutritional adequacy if you intend to further restrict carbohydrates in your diet. Researchers are discovering that people who eat more plant-based foods of all kinds, including carbs, have some of the best health outcomes.

LOW CARB DIET: KEY ASPECTS [CARBS 35-40% | PROTEIN 25-35% | FAT 25-30%]

FRUITS AND VEGETABLES

- Bright colors, bold flavor
- Limit starchy veggies to 1/2 cup per day or less
- Whole fruit is better than juice
- Leafy green veggies are optimal
- Limit fruit juice to 1/2 cup per day (no sugar or sweetener)

MILK PRODUCTS

- Liquid milk and plain yogurt are optimal
- Choose primarily lower fat varieties (2%) without added sugar
- Avoid cheese

PROTEIN FOOD

- Eat at least a 1/4 to 1/2 cup of legumes per day
- Limit red meats to 3 – 4.5 oz per week, or less
- Eat fish or other seafood at least 2 to 3 times per week
- Remove all visible fat and skin from meat, fish and poultry
- Prepare meat by baking, broiling, steaming or poaching
- Avoid frying meat

FATS AND OILS

- Vegetable fats are optimal
- Minimize animal, solid and trans fats

GRAINS AND STARCHY VEGETABLES

- At least 3 to 4 servings of grains should come from whole grains.
- Avoid grain products with added sugar
- Minimize intake of grain products with added fat.

GENERAL

- Minimize or avoid added sugars and foods with added sugar. This is especially important if you are trying to lose weight or control your blood sugar levels, or if your triglyceride levels are elevated

FAT METABOLISM | THE ROLE OF GENETICS

Acting as an important part of any diet and a source of energy, fat provides flavor to your diet, but more importantly, it is a vital element in the absorption of fat-soluble vitamins such as vitamins A, D, E and K. The two major types of fat include Saturated (such as beef, lamb, cream, pork, butter, coconut oil etc.) and Unsaturated (**POLYUNSATURATED** – corn oil, fish & seafood, sunflower oil and **MONOUNSATURATED** – avocado, nuts, olive oil, peanuts) fats. An excess of saturated fats in your diet is said to raise cholesterol levels in the blood and therefore it is often recommended that these be avoided for a healthy lifestyle. In order for your body to function normally, you need to maintain a consistent and balanced supply of saturated and unsaturated fats.

A third type of fats consists of hydrogenated fats, which are processed fats that are not found naturally, such as in margarine and fried fast foods. Hydrogenated fats may also contain trans fatty acids and are generally unhealthy and should be avoided.

Over the past few decades we've been made to believe that fat consumption is "bad" for us in every way. Science is now however starting to move away from such a simplistic view of fat. We're beginning to understand more and more that dietary fat is not necessarily linked to body fat in such a linear way. Scientific research has clearly indicated that genetics play a role in the transport and metabolism of the fat we consume as part of our daily diet, and the resultant effect on some key health factors - our cholesterol level, for example. Using the genes we tested for your **GENIXPRO™ HEALTH SCREENING** report, in the following section, we can look at two scenarios associated with fat.

CASE 1: How your body reacts to Saturated fat consumption with respect to **WEIGHT MANAGEMENT**, and

CASE 2: How your body reacts to Unsaturated fat consumption with respect to **WEIGHT MANAGEMENT**.

CASE 1: LOW SATURATED FAT DIET EFFECTIVENESS – WEIGHT MANAGEMENT

ASSESSMENT CATEGORIES



GENES TESTED	FTO, PPARG, APOA2, CLOCK, LIPC, APOA5, PLIN1, FABP2, ADRB3, NPY
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If your genetic predisposition indicates that a low-fat diet would be **EFFECTIVE** or **SLIGHTLY EFFECTIVE**, it means you would likely see more marked benefits in terms of weight loss, heart health and managing obesity from such diet choices. A low fat diet recommends that fats comprise a maximum of 20% of your daily caloric intake (upto12% monounsaturated fats). The remaining 80% of daily calories are comprised of carbohydrates and protein, with general recommendations to consume about 45-60% of carbs and 20-35% of proteins.

As the name suggests, a low-fat diet restricts fat (particularly saturated fat) intake, while increasing protein intake. If you are looking at building lean muscle mass, consider boosting protein intake to 40%, while decreasing carbs to 40%. You can minimize your saturated fat intake by opting for lean cuts of meat such as chicken breast, pork tenderloin or loin, eye of round steak, sirloin tip side steak, top round roast and steak.

Include reduced fat milk and dairy products. Limit foods that contain coconut milk or cream such as curries and some desserts, e.g. chendol, mango sticky rice with coconut cream. Food preparation is important too. Always trim away visible fat before cooking. Grilling or broiling lean portions of pork or chicken does not add any extra fat. Season food with herbs and spices such as ginger, garlic, lemongrass etc. These seasonings add plenty of flavor with minimal fat. Stir fry vegetables in a non-stick pan instead of a wok, so as to lessen the amount of cooking oil needed.

Olive oil is usually considered a healthy option to cook with. When eating out, minimize or avoid gravy, sauces and fried sides, such as fried anchovies. Limit fried foods to an occasional splurge. Moderation is key as a low fat diet is not a no fat diet.

CASE 2: RESPONSE TO MONOUNSATURATED FATS

Fat is an important part of any diet, and not all fats are bad. Monounsaturated fat is considered a healthy dietary fat found in avocados, olives, peanuts and other nuts, as well as oils, such as olive oil, peanut oil and canola oil.

The two possible outcomes for this test are "Increased Benefit" or "Normal Benefit." Having an "Increased Benefit" from monounsaturated fat suggests you could benefit from eating foods containing monounsaturated fats. In general, it is best to minimize saturated and trans fats in your diet.

Genetic variants in two genes, ADIPOQ and PPARG, have been associated with a lower body weight in individuals when more than 13% of their calories come from monounsaturated fats. This could be an individual on an 1800-calorie diet consuming about one to two tablespoons of olive oil and a quarter cup of nuts each day as part of their total caloric intake. Take note that while the ADIPOQ study was done in a population of both men and women, the PPARG study was done only in women. There is not enough scientific evidence to support if the PPARG association is also true in men.

ASSESSMENT CATEGORIES



GENES TESTED	ADIPOQ, PPARG, GCKR, PKD2L1
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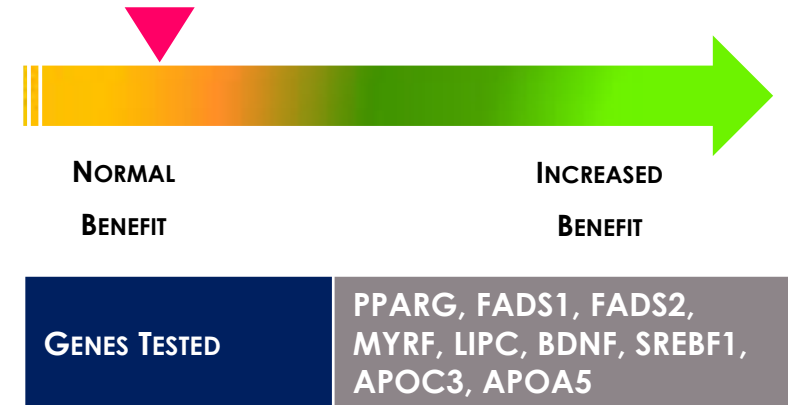
Monounsaturated fatty acids such as omega-7 (e.g. palmitoleic acid from macadamia nuts) and omega-9 (e.g. oleic acid from olive oil) are known for their anti-inflammatory properties, to lower triglycerides and blood pressure, and support heart health. Good quality monounsaturated fats are also wonderful for your skin as they keep the epidermis hydrated, and supply ceramides and fats that are essential for healthy skin and hair. For individuals with "**NORMAL BENEFIT**", the amount of dietary monounsaturated fat does not affect body weight. However, substituting saturated and trans fats with monounsaturated fats is still recommended, for its health benefits.

CASE 2: RESPONSE TO POLYUNSATURATED FATS

Polyunsaturated fats include omega-3 and omega-6 fatty acids and are important for growth and development as well as in lowering triglycerides, reducing blood pressure, improving blood vessel function, preventing irregular heart rhythms, reducing inflammation, and improving joint pain and stiffness. Omega-3 fats appear to be important for cognitive (brain memory and performance), and behavioral function. Omega-6 fats help stimulate skin and hair growth, maintain bone health, regulate metabolism, and maintain the reproductive system.

While a healthy diet should comprise an equal ratio of omega-3 and omega-6 fatty acids, it is common for us to have way more omega-6 than omega-3. Aim to increase your intake of omega-3 fats, while limiting the intake of omega-6 fats (from fried and processed foods). The main omega-3 fatty acids are EPA and DHA, found in oily fish such as anchovies, herring, salmon, sardines. ALA is an omega-3 fatty acid found exclusively in plant sources such as walnuts, flaxseeds, sunflower seeds, and canola oil. Aim to eat two to three 150g servings of oily fish a week. You can further boost your omega 3 with fortified foods such as eggs, milk or soya milk.

ASSESSMENT CATEGORIES



The two possible outcomes in this report are "**INCREASED BENEFIT**" or "**NORMAL BENEFIT**". Having an "Increased Benefit" from polyunsaturated fat means you should try to eat foods containing such fats. In general, it is best to minimize saturated and trans fats in your diet. One study in women has shown that those with a certain genetic variant in the PPARG gene tend to have a lower body weight when they consume more polyunsaturated fats than saturated fats. This association has not been studied in men.

MEDITERRANEAN DIET EFFECTIVENESS

The Mediterranean diet is a primarily plant based diet. Whole grains, fresh fruits and vegetables, legumes, beans and nuts, fish, seafood, herbs and spices are plentiful, with small amounts of lean meat and chicken. Eggs and dairy products are consumed in small portions. Sweets are also minimal. Red wine is consumed with meals.

The Mediterranean diet is known to have many health benefits. Rich in monounsaturated (good) fats, it reduces risk of heart disease, stroke, increases HDL (good) cholesterol, reduces LDL (bad) cholesterol, and delays cognitive decline. It is also associated with longevity. People with genetic variations in the ADIPOQ gene benefit greatly from the Mediterranean diet, which also helps to facilitate fat loss and improves metabolic health. Although this type of diet has been consumed for a long time around the Mediterranean region, it only recently gained mainstream popularity as a good way to improve health and prevent disease.

ASSESSMENT CATEGORIES

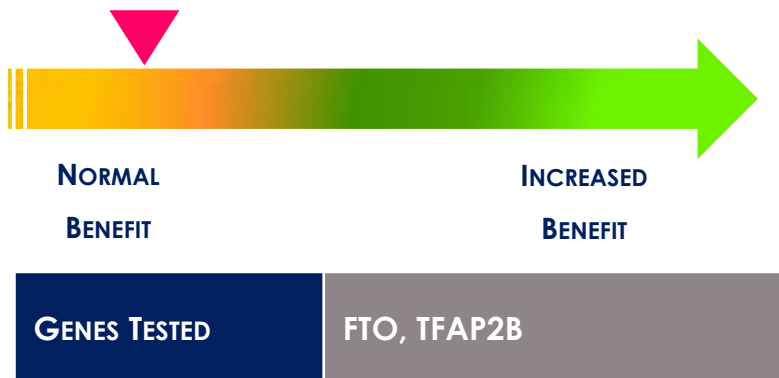


GENES TESTED	TCF7L2, PPARG, CLOCK, SIRT1
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The Mediterranean diet is usually not prescribed as a weight loss diet, it is rather seen as a healthy diet that can help prevent cardiovascular disease and premature death. That being said, people usually tend to lose some weight on the Mediterranean diet. If you choose to adopt this diet, you may ease the transition by simplifying and planning your meals in advance; keeping pantry staples like olive oil, canned tomatoes, whole grains, pasta, and tuna on hand; and shopping for fresh produce and seafood a few times a week. You can easily grill or broil many Mediterranean diet foods. Snacks can be quick and easy, too: simply grab a clementine or a handful of nuts, or dip whole wheat pita chips into hummus.

PROTEIN RESPONSE

ASSESSMENT CATEGORIES



If you're trying to shed a few extra kilos or are a typical dieter, you've probably wondered - 'how much protein should I eat per day to slim down?' An average adult requires about one gram per kg of body weight of protein as per recommendations. Many people assume eating more protein can help them lose weight effectively, but that's not necessarily the case. Knowing your recommended daily allowance for each specific nutrient - protein in this case - can help you maximize your fitness potential.

Eating a diet rich in protein has been linked to a number of health benefits. Protein is considered the single most key nutrient for weight loss. It can help you build lean muscle, feel full after eating, reduce hunger and boost metabolism. A high-protein diet combined with a regular exercise regime can help you lose weight and belly fat effectively. Although protein is one of the most important nutrients for the human body, following a balanced diet is a vital part of staying healthy and fit.

Many people tend to eat the most amount of protein towards the end of the day during dinner. However, for the body to effectively absorb and break down protein, the intake should be divided evenly throughout the day. This will not only help in regulating hunger hormones but also prevent cravings by helping a person feel fuller for a longer time. Many vegetarians tend to be deficient in protein and must consider appropriate supplementation through dietary choices. Protein deficiency tends to make one feel hungrier and overeat, leading to severe weight gain.

Loss of muscle mass is one of the first signs of inadequate protein intake and can increase the risk of bone fractures. Muscles are the largest reservoir of protein and when there is inadequate supply, the body takes protein from skeletal muscles to preserve tissues and body functions. This can lead to wasting over time, true even in case of moderate protein insufficiency.





EATING BEHAVIOR TRAITS

Eating behavior can be influenced by genes. There are certain genes that have the potential to impact how we perceive and desire particular foods, and influence our eating behaviors, such as excessive snacking and difficulty feeling full. For example, variants in the ANKK1 and DRD2 genes, which result in a reduced density of dopamine receptors in our brain, have been associated with eating and addictive behaviors. This type of information, generated from testing genetic markers in a number of genes, is included in your report, and can be used to understand how to modify your lifestyle and behavior for optimum wellness.

EATING BEHAVIOUR	
TRAIT	SAMPLE ASSESSMENT
SNACKING TENDENCY	INCREASED
SATIETY	DIFFICULTY FEELING FULL
EMOTIONAL EATING TENDENCY	MORE LIKELY
SWEET TASTE PREFERENCE	MORE LIKELY
BITTER TASTE PERCEPTION	NON-TASTER

SNACKING TENDENCY

ASSESSMENT CATEGORIES



GENES TESTED	LEPR, MC4R, ADIPOQ
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Snacking can be a healthy or unhealthy behavior. The average calorie intake during a meal is about 500 kilocalories leaving a range of 300-500 kilocalories for snacks between meals. Eating healthy foods in small portions throughout the day can help control hunger cravings and reduce total caloric intake. Whereas overdoing this daily allowance can cause weight gain no matter whether the snack is healthy or unhealthy.

Genetic markers associated with snacking behavior include variants in the receptor for leptin, an essential hormone for the regulation of food intake. The possible results in this report are "Typical" and "Increased." If you receive the "Increased" result, you may want to curtail the negative effects of snacking by choosing healthy snacks like nuts and seeds, eating slowly and reducing the portion size or calories consumed from snacks.

SATIETY – FEELING FULL

ASSESSMENT CATEGORIES



GENES TESTED	FTO, LEPR, MC4R, NMB
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Satiety can be described as the feeling of fullness after you eat. The FTO (fat mass and obesity-associated) gene is known to be an important factor that predisposes a person to a healthy or unhealthy level of body weight. The two possible outcomes in this report are "Difficulty Feeling Full" and "Typical."

Individuals who experience "Difficulty Feeling Full" tend to eat more without feeling satisfied. To help manage this outcome, you could increase the amount of fiber in your diet and balance meals and snacks throughout the day. Examples of foods high in fiber include whole wheat bread, oatmeal, barley, lentils, black beans, artichokes, raspberries, and peas.

EMOTIONAL EATING TENDENCY

ASSESSMENT CATEGORIES



GENES TESTED	DRD2, OPRM1, PER2, FTO, MC4R
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Emotional eating is responding to feelings such as stress by eating high-carbohydrate, high-calorie foods with low nutritional value. Generally, emotional eating is conceptualized as eating in response to negative affect. While emotional eating can be a symptom of what mental health professionals call atypical depression, many people who do not have clinical depression or any other mental health issue engage in this behavior in response to momentary feelings or chronic stress. This behavior is highly common and is significant since it can interfere with maintaining a healthy diet and contribute to obesity.

Although there is no objective method to quantify someone's feeling of hunger or liking for a particular type of food, behavioral scientists have devised techniques to measure an individual's motivation to consume food and compare it with that of others. This measurement, called the reinforcing value of food, describes how much effort an individual is willing to put forth to get access to food.

An important step in managing stress is exercise, since regular physical activity tends to dampen the production of stress chemicals, even leading to a decrease in depression, anxiety, and insomnia in addition to decreasing the tendency to engage in emotional eating.

SWEET TASTE PREFERENCE

ASSESSMENT CATEGORIES



Sweet is one of the most basic tastes we can experience, and is usually found in sugar and sugary foods. The sensation of sweet taste is triggered to the brain from the taste buds. There are receptors on your tongue that are programmed by your genes to determine how you taste sweetness.

A 2009 study showed that genetic variants found in the sweet taste receptors can result in "Typical" or "Decreased" sensitivity to the sweet taste of sugar. Individuals with "Decreased" sensitivity are "More Likely" to prefer foods with more sugar since they are less likely to taste sweetness in foods that are low sugar.

GENES TESTED

FGF21, FTO, SLC2A2, TAS1R3

BITTER TASTE PERCEPTION

ASSESSMENT CATEGORIES



GENES TESTED	TAS2R38, TAS2R16, TAS2R46
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People taste things differently. Variations in the TAS2R38 gene are associated with different levels of sensitivity to a chemical called PTC, which produces a strong bitter taste.

The possible results for bitter taste are "Taster" and "Non-Taster". An individual identified as a "Taster" may be more sensitive to bitter flavors found in foods, such as grapefruit, coffee, dark chocolate and cruciferous vegetables, such as brussels sprouts, cabbage and kale. Being a "Taster" does not mean you do not enjoy these foods, but you may sense a stronger bitter taste compared to a "Non-Taster."

In addition, tasters may need to watch their salt intake, because they may have an increased preference for salty foods, which mask the bitterness. A genetic result of "Inconclusive" means that there is not enough scientific evidence for how your genotype is associated with bitter taste sensitivity.



DETOXIFICATION | ANTIOXIDANTS

Everyday, we are exposed to various toxins, fungi and bacteria on a daily basis. It comes from the food we eat, the air we breathe, the hygiene products and home cleaning products we use, etc. Not to mention normal biochemical reactions that occur in our bodies, i.e. fat or energy metabolism, that produce free radicals. Our immune system and organs such as liver do a very good job of processing and removing waste products from our bodies. However, sometimes it is not enough to just rely on your body's natural processes. This is especially important for individuals with poor diet, alcohol consumption, smoking, those who are exposed to pollution, those who take medication on a regular basis, etc. This is because the cumulative effect of the constant exposure to the above factors is a major part of ageing process and is linked to the development of chronic diseases. Thus, healthy eating and supplementation is important to support detoxification process.

DETOXIFICATION ANTIOXIDANTS	
TRAIT	SAMPLE ASSESSMENT
DETOXIFICATION ABILITY	INTERMEDIATE
ANTIOXIDANT REQUIREMENT	MODERATE NEEDS
GLUTATHIONE REQUIREMENT	HIGHER NEEDS
CoQ10 REQUIREMENT	NORMAL NEEDS

DETOXIFICATION ABILITY

Detox is sometimes referred to in the media as various extremely restrictive short-term diets, such as consuming only fruit juice for a few days. However, when we refer to detoxification we are referring to the body's actual biological process that takes place in the liver. This happens in two phases, but depending on our personal genetic profile the two phases interact with each other differently and affect our personal ability to detoxify harmful chemicals consumed in our diets. The good news is that by understanding our own personal need for certain food types based on these genes, we can effectively cancel out any impaired detoxification ability we may have.

PHASE 1: SMOKED / CHARGRILLED MEAT – RISK OF DNA DAMAGE

Cooking certain meats at high temperatures creates the formation of chemicals that are not naturally present in uncooked meat. Some of these chemicals, known as **HCA** (Heterocyclic Amines) and **PAH** (Polycyclic Aromatic Hydrocarbons), are regarded as toxic compounds that can damage DNA and protein in our cells, possibly leading to serious health problems in the long run. Foods cooked at very high temperatures or for a very long time create the highest levels of these chemicals, so be aware of your consumption.

ASSESSMENT CATEGORIES

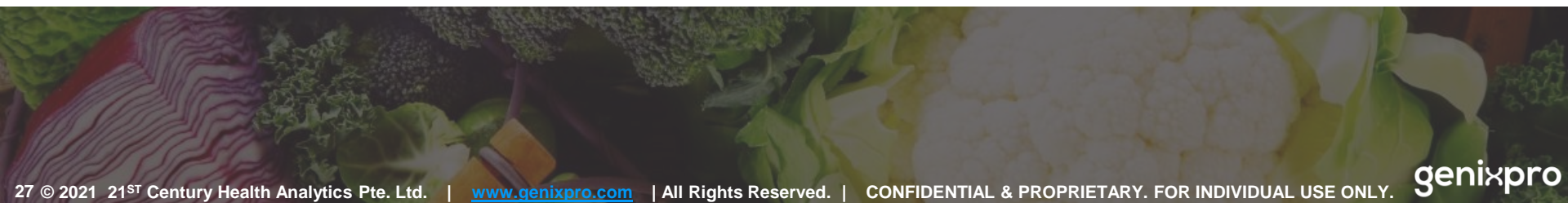


GENES TESTED	CYP1A2, SOD2, NAT2, EPHX1, PON1, NQO1, GSTP1, GSTT1, GSTM1, CYP1B1, NFE2L2
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DETOXIFICATION ABILITY

PHASE 2: CRUCIFEROUS VEGETABLE REQUIREMENT (CABBAGE-FAMILY)

After Phase 1, the body needs Phase 2 to “finish the job” of detoxification. Two genes exist that affect the second phase of the detoxification process - GSTM1 and GSTT1. However, in some individuals these genes are not actually present. Luckily, with adequate intake of the correct vegetables, we can all but cancel out the lack of these genes. Vegetables such as cabbage, cauliflower and broccoli are known as “Cruciferous” vegetables. Rich in vitamin C, minerals and soluble fiber, these vegetables promote your body's natural ability to remove dangerous toxins created in Phase 1. So even if you have the “Deleted” version of the detoxification genes, getting enough cruciferous vegetables means you'll be in good stead when it comes to detoxification



ANTIOXIDANT REQUIREMENT

ASSESSMENT CATEGORIES



GENES TESTED	SOD2, CAT, GPX1, NQO1, NOS3, TNF-A, CRP, IL6, SOD3
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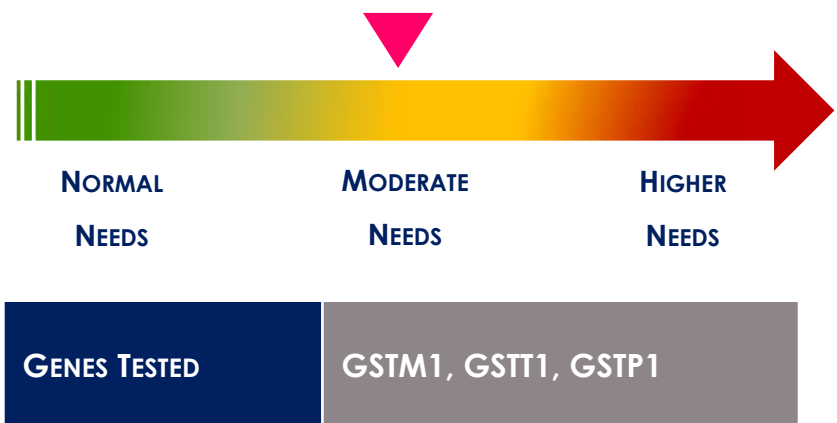
Dietary antioxidants are very important sources of protection from free radicals and other types of oxidative stress. In order to support your body's own protection mechanism it is important for you to ensure that you reach your goals for vitamins A, C, E and selenium.

Anti-oxidants are molecules found in fresh foods such as vegetables and fruits; they play a part in reducing the effects of harmful molecules called "Free Radicals" which are responsible for tissue ageing, DNA damage and even contribute to some diseases. In summary, free radicals are harmful to our general health.

However, the good news is that a diet rich in anti-oxidants can help reduce the damage caused by these free radicals. Our genes can show us how strong our natural protective systems are for removing free radicals, and from this we can change our diet accordingly. Those with lower natural ability to protect against free radicals should deliberately increase their intake of anti-oxidant foods. Interestingly, a large study that was recently published by Newcastle University showed that organic crops contained up to 60% more key anti-oxidants than non-organically farmed crops. If you have a raised genetic need for anti-oxidants, eating organic fruit and vegetables is a great way to get started.

GLUTATHIONE REQUIREMENT

ASSESSMENT CATEGORIES



Genetic variations may lead to lower production and activity of glutathione, compromising its ability to destroy free radicals, peroxides, lipid peroxides and heavy metals from the body.

Glutathione is a powerful antioxidant produced naturally by the liver. It is involved in tissue building, inflammation control, boosting immune system response, nutrient metabolism, and regulation of cellular functions. It is required for proper utilization and functioning of other antioxidants such as vitamins C, E, selenium and carotenoids. Glutathione deficiency contributes to oxidative stress, which plays a key role in aging and age-related diseases.

Fruits and vegetables are good dietary sources of glutathione. However, it is important to consume them fresh and not cooked or processed, as cooking greatly reduces glutathione content. Options containing the most glutathione per serving include: asparagus, potatoes, peppers, carrots, onion, broccoli, avocados, squash, spinach, garlic, okra, cauliflower, walnuts, tomatoes, grapefruit, apples, oranges, peaches, bananas and melon. Eating high protein foods such as beef, pork, poultry, fish, cheese, tofu, legumes will also boost glutathione levels, as they are high in essential amino acids required to make glutathione. Studies show that the expression and activity of GSTT1 and GSTM1 genes coding for glutathione can be induced or 'turned on' by the consumption of cruciferous vegetables (like cauliflower, cabbage, water cress, bok choy, broccoli, Brussels sprouts). Although regular exercise boosts glutathione production, athletic over-training may result in lower glutathione.



CoQ10 REQUIREMENT

ASSESSMENT CATEGORIES



The recommended adult dose for CoQ10 supplementation is 30mg-200mg daily, which is considerably higher than average dietary intake. Higher doses may be recommended for specific conditions. When taking supplements, look for the ubiquinol form of CoQ10.

Coenzyme Q10 (CoQ10) is found in every cell of your body. Especially high concentrations are found in organs with high energy requirements, such as the kidneys, liver, skeletal muscle and heart. CoQ10 provides energy to cells for growth and maintenance, and also protects them from free radical damage. CoQ10 levels gradually decline with age.

Variations in the NQO1 gene may result in inability to convert CoQ10 to ubiquinol, its active form. Individuals on medication to control high blood sugar or high cholesterol levels may have a greater need for CoQ10, as these medications block CoQ10 production.

CoQ10 is naturally present in small amounts in a wide variety of foods. Organ meats such as heart, liver, and kidney, as well as beef and fish contain high amounts of CoQ10. Other relatively rich sources include soybean and canola oils, and nuts. To maximize your CoQ10 intake from food, braise, bake, boil or steam rather than fry.

CoQ10 is fat soluble, and is best taken with a meal containing fat to optimize absorption. CoQ10 may reduce the body's response to blood thinners, e.g. warfarin, and decrease insulin requirements in diabetics. Consult your physician if you are taking these medications.



FOOD SENSITIVITY

As unique individuals, some of us are more sensitive to certain dietary ingredients than others. Our genetics may impact how we respond to some foods. Courtesy specialized genetic testing, we can now help identify those with higher sensitivities to caffeine, salt, milk products, gluten among others. By understanding our personal sensitivity to these ingredients, we can make informed choices about our own consumption.

FOOD SENSITIVITY	
TRAIT	SAMPLE ASSESSMENT
CAFFEINE SENSITIVITY	MODERATE SENSITIVITY
ALCOHOL SENSITIVITY	NORMAL SENSITIVITY
LACTOSE INTOLERANCE	MORE LIKELY
SALT SENSITIVITY	HIGHER SENSITIVITY
GLUTEN SENSITIVITY	NORMAL SENSITIVITY
HISTAMINE AND LECTIN SENSITIVITY	NORMAL SENSITIVITY

CAFFEINE SENSITIVITY

ASSESSMENT CATEGORIES



GENES TESTED	CYP1A2*1F, ADORA2A, VDR
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Typically, 200-400mg of caffeine a day appears to be safe for most healthy individuals. That said, it is always advisable to keep track of your daily caffeine consumption to ensure that you stay within healthy levels and avoid any potentially damaging effects related to excessive caffeine consumption.

Caffeine is a common stimulant many of us consume on a regular basis, primarily from coffee, but also from energy drinks, tea, chocolates and even certain pain relievers and medicines. Variation in gene responsible for caffeine metabolism results in different levels of enzyme activity, and thus, different metabolism rates. In addition, Vitamin D Receptor (VDR) interactions may affect the influence of caffeine on bone mineral density. Individuals with impaired metabolism can become hypersensitive to caffeine and may experience symptoms like anxiety, insomnia, headaches, stomach irritation, high blood pressure and increased heartbeat, even when consuming very small amounts of caffeine.

Caffeine dramatically increases the body's secretion of cortisol, a hormone the body uses to deal with stress, in particular, pain and inflammation. Research shows that cortisol helps decrease insulin sensitivity in the body which means blood sugar is less available to the cells for producing energy. This is particularly detrimental to people with diabetes. Excessive caffeine intake has also been associated with onset of several chronic diseases. Caffeine accelerates destruction of glucosamine in the body's cartilage and can be detrimental to older individuals (40 years and above) as cartilage destroyed by caffeine at this time is permanently lost unless replaced by nutritional supplementation.

ALCOHOL SENSITIVITY

ASSESSMENT CATEGORIES



GENES TESTED	ALDH2, ADH1B, ADH1C, OPRM1, ANKK1
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Drinking alcoholic beverages is a relaxing or social activity for many, but for some it is exceedingly unpleasant due to their body's adverse reaction to alcohol. One such reaction is called **Alcohol Flush**, in which drinking even small amounts of alcohol causes an individual's face to flush red and in some cases feel warm and itchy. Individuals who flush may also experience other unpleasant symptoms, such as rapid heartbeat, nausea, or dizziness in response to alcohol.

Alcohol flush is largely attributed to genetic variation in the ALDH2 gene, which encodes an enzyme critical for proper alcohol metabolism. Those who carry the inactive version of this gene are much "More Likely" to flush and experience other negative response to alcohol, while people with other genotypes are "Less Likely" to flush. Perhaps not surprisingly, this variant is also associated with overall reduced consumption of alcohol. In most cases, avoiding alcohol is the best remedy for those who experience alcohol flush.

This test also investigates a certain version of the ADH1C gene has been shown to have a positive effect specifically on HDL (good) cholesterol levels, but with moderate alcohol consumption only. ADH1C metabolises alcohol, creating acetaldehyde which is a toxic substance responsible for some of the negative effects of alcohol consumption. Acetaldehyde is itself metabolised by aldehyde dehydrogenase into non-toxic substances. In some cases, the ADH1C gene polymorphism causes an amino acid change in the protein sequence which affects enzyme activity. Higher enzyme activity metabolises alcohol more rapidly to the toxic intermediate acetaldehyde which is also associated with hangover symptoms.

LACTOSE INTOLERANCE

ASSESSMENT CATEGORIES



GENES TESTED	MCM6, LCT
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Lactose is a sugar that is found naturally only in milk products, however nowadays we often find it everywhere, in almost all processed foods. Lactose is digested in the body by an enzyme called lactase. Lactose intolerance is the inability to digest lactose.

In the majority of the world's population, the enzyme lactase is only produced for a few years of early life. As far as evolution is concerned, we only need it while we feed on our mother's milk – so as a result most of the world's population are lactose intolerant. This is not a disease, nor is it too serious, but it does mean that lactose is not digested as normal, but instead is fermented by gut flora - creating gas that can cause discomfort, pain and diarrhea.

If you are lactose intolerant you should ensure that you are getting enough calcium from non-dairy or lactose-free sources. On the other hand, if you are not lactose intolerant, be aware that dairy products can be high in calories, fat, or both and you may need to watch your consumption accordingly.

SALT SENSITIVITY

Salt is made up of Sodium and Chloride. For health reasons we are mostly concerned with our sodium intake as it can cause high blood pressure or hypertension in those who are genetically susceptible.

Commercial foods that we buy from the supermarket often include large amounts of hidden sodium, before we even add salt to our cooking ourselves. As such, it is a good idea for all of us to be aware of how much salt we consume on a daily basis.

Thanks to genetic science, we can now identify those who have to be extra careful with their sodium intake as they have a genetic predisposition to salt-sensitive hypertension.

ASSESSMENT CATEGORIES



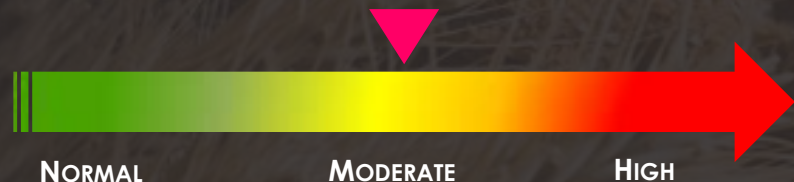
GENES TESTED	AGT, ACE, NOS3, AGTR1, ADD1, SLC4A5, NEDD4L, GNB3, ATP2B1, GRK4
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SENSITIVE TO SALT: <2,200 MG / DAY SODIUM

Your genetic tests may reveal that you have the genotype that possibly predisposes you to hypertension when salt (specifically sodium) consumption is excessive. You are advised to limit your salt intake to a maximum of 5.5g/day, equivalent to about 2.2g/day sodium. You are advised to consult your healthcare provider before any making any modifications to your lifestyle or to your diet.

GLUTEN SENSITIVITY

ASSESSMENT CATEGORIES



GENES TESTED	HLA-DQA1, HLA-DRA, DQ2.2, DQ8, 4Q7, SH2B3, DQ8, MYO9B
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The results of your genetic test may reveal that, even though the risk is not high, it is not possible to exclude a predisposition to Celiac disease. A positive genetic test result does not mean that you will certainly develop celiac disease and it is not a reason for you to avoid gluten unless an intolerance has actually been diagnosed.

CELIAC PREDISPOSITION | THE RISK

Celiac disease is a common digestive condition that occurs when a person has an adverse reaction to gluten, a protein found in grains such as wheat, barley and rye. For those with celiac disease, eating gluten can create an immune reaction in the small intestine, causing a wide-range of symptoms from diarrhea to malnutrition.

Around 1% of the population on average are affected by celiac disease, and require lifelong complete avoidance of gluten. The condition is severely under diagnosed and in Europe and the USA about 80% of people with celiac disease may not even know that they have it. The seriousness of celiac disease is mainly due to this under diagnosis. Living with celiac disease but not knowing, means living with a damaged intestine which cannot absorb all the micronutrients from food that it needs to – this in turn causes a sort of mild but chronic malnutrition which in the long term increases incidence of diseases like anemia, osteoporosis and cancer. When celiac is diagnosed it is usually not a problem, as long as gluten is avoided. Variants in the HLA gene can raise or lower the genetic predisposition to celiac disease, and with certain cases can virtually eliminate the risk of celiac altogether.

HISTAMINE AND LECTIN SENSITIVITY

ASSESSMENT CATEGORIES



GENES TESTED	AOC1, CNR1, MTHFR, HNMT
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Histamine is a neurotransmitter that travels through your body in your bloodstream and helps break down food in your stomach. But it is also a part of a healthy immune system that sets off a warning when your body needs to fend off any possible illnesses. Lectins are proteins often found in foods containing seeds, with some exceptions. Lectins are also found in some roots and in early stage leaves.

Lectins can induce mast cell reactions, which cause histamine intolerance symptoms. Similar to seasonal allergies or a food allergy, a reaction to histamine is inflammatory. When triggered, mast cells in your tissue will release histamine into the bloodstream, which causes your red blood cells to become bigger and helps white blood cells find the foreign pathogen – or threat to your immune system. Since histamine is something that your body naturally makes, eating high histamine foods usually won't have negative side effects. However, for people who have a hard time breaking down excess histamine, eating certain foods can trigger symptoms or make them even worse.

Individuals identified as having “Higher Sensitivity” to histamine and lectin may consider avoiding eggplant, pumpkin, spinach, citrus fruits, shellfish, cured meats, legumes, milk and dairy products for at least 2-3 weeks.

TIPS | FOOD SENSITIVITY

SALT SENSITIVITY

- Always taste your food before adding salt; you may not actually need the extra salt!
- Look for hidden salt in pre-packaged food at the supermarket; sodium levels are often surprisingly high.
- Consider adding herbs or spices to your food to enhance the flavor without the extra salt.

ALCOHOL SENSITIVITY

A unit of alcohol is defined as:

Half a pint of normal strength beer or lager

1 small (150ml) glass of wine

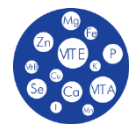
1 single shot (30ml) of sherry

CAFFEINE SENSITIVITY

- Remember that caffeine is also found in many teas, energy drinks and even some medicines.
- To cut down on your caffeine consumption, consider drinking more caffeine-free herbal teas in place of everyday tea.
- The drink with the highest caffeine concentration is filter or drip coffee, with between 115-135 mg per small cup.

NON CELIAC GLUTEN SENSITIVITY

- Individuals with non-celiac gluten sensitivity have a prevalence of extra-intestinal or non-GI symptoms, such as headache, joint pain, and numbness in the legs, arms or fingers. One will have to investigate the impact more closely before eliminating gluten from their diet



VITAMINS | MINERALS

WHY ARE VITAMINS A, C, E AND OTHER MICRONUTRIENTS IMPORTANT FOR OUR HEALTH?

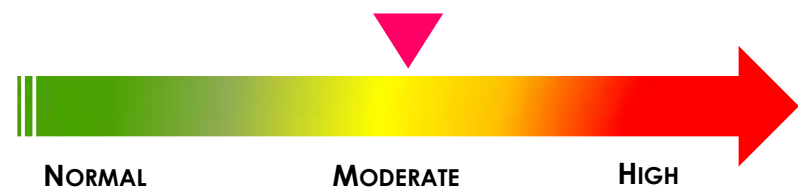
Vitamins are made up of organic molecules essential for normal metabolism, growth and cell function. Because our bodies generally can't produce vitamins, it's important to supplement with adequate vitamin intake from our diet. There are genetic markers associated with being predisposed to lower levels of certain nutrients, which means you may want to ensure your diet has enough of the foods that contain these nutrients. As part of a healthy diet, we advise plenty of foods rich in Vitamin A, C and E to lessen the effects of oxidation.

- Some example of foods rich in Vitamin A are dark leafy greens such as Kale and Spinach
- Vitamin C can be found in citrus fruits, broccoli and chili peppers
- Almonds, avocados and sunflower seeds are great sources of Vitamin E

VITAMINS MINERALS	
TRAIT	SAMPLE ASSESSMENT
VITAMIN A REQUIREMENT	HIGHER NEEDS
VITAMIN B2 REQUIREMENT	NORMAL NEEDS
VITAMIN B6 REQUIREMENT	HIGHER NEEDS
FOLATE (VITAMIN B9) REQUIREMENT	MODERATE NEEDS
VITAMIN B12 REQUIREMENT	MODERATE NEEDS
VITAMIN C REQUIREMENT	MODERATE NEEDS
VITAMIN D REQUIREMENT	HIGHER NEEDS
VITAMIN E REQUIREMENT	NORMAL NEEDS
VITAMIN K REQUIREMENT	HIGHER NEEDS
CALCIUM REQUIREMENT	MODERATE NEEDS
MAGNESIUM REQUIREMENT	MODERATE NEEDS
IRON REQUIREMENT	MODERATE NEEDS

VITAMIN A REQUIREMENT

ASSESSMENT CATEGORIES



GENES TESTED	BCO1, BCMO1, CYP26B1, RBPR4, TTR
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Vitamin A is essential for healthy vision; immune system action; maintaining healthy skin, teeth, skeletal, soft tissue and mucus membranes; bone growth and reproduction, and the proper regulation of gene expression. It is also known as retinol because it produces the pigments in the retina of the eye. Vitamin A promotes good vision, especially in low light.

Much of the vitamin A found in our body is derived from beta-carotene. If you are vegetarian or vegan, ensure that you are getting sufficient retinol (active form of vitamin A), from vitamin A fortified foods, as retinol is typically found in animal food sources, such as liver, butter, cod liver oil, tuna and eggs. Carotenoids, precursors to vitamin A, come from leafy green vegetables, orange and yellow vegetables such as carrots, pumpkin, sweet potatoes, tomatoes, orange fruits such as papaya. The recommended intake of vitamin A for most adults is 700 to 900 micrograms per day.

Variations in BCMO1 gene may result in impaired Vitamin A conversion from beta-carotene, and predispose some individuals to lower vitamin A levels. They're advised to consume adequate amounts of pre-formed vitamin A found in fortified milk and breakfast cereals, as well as in multivitamins containing retinyl palmitate or retinyl acetate.

VITAMIN B2 REQUIREMENT

ASSESSMENT CATEGORIES



GENES TESTED	MTRR, MTHFR
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Individuals with genetic variations in the MTHFR and MTRR genes may have a higher tendency for riboflavin deficiency.

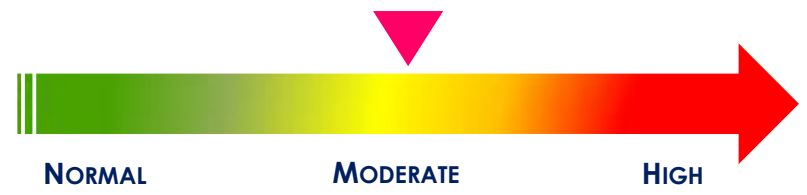
Vitamin B-2, or riboflavin, and the other B vitamins help your body build red blood cells and support other cellular functions like breakdown of fats, proteins, and carbohydrates. You may have experienced an energy boost from taking supplements containing B vitamins.

Having a riboflavin deficiency can lead to other nutritional deficiencies because riboflavin is involved with processing nutrients. The primary concern associated with other deficiencies is anemia, which happens when you don't get enough iron. It's especially important to make sure you get enough riboflavin in your diet if you're pregnant. A riboflavin deficiency could endanger your baby's growth and increase your chances of preeclampsia, which involves dangerously high blood pressure during pregnancy. This is a serious condition that can be life threatening.

Riboflavin rich foods include dairy products, (e.g. milk, cheese and yogurt), eggs, enriched or fortified cereals and grains, nuts, lean meats, liver, dark green vegetables, (e.g. asparagus, broccoli, spinach and turnip greens), fish and poultry. Riboflavin is a water soluble nutrient, meaning that you lose about twice as much riboflavin content in cooking water when foods are boiled. Steam, microwave or stir-fry your foods to retain as much riboflavin as possible.

VITAMIN B6 REQUIREMENT

ASSESSMENT CATEGORIES



GENES TESTED	NBPF3, MTRR, CBS, BHMT
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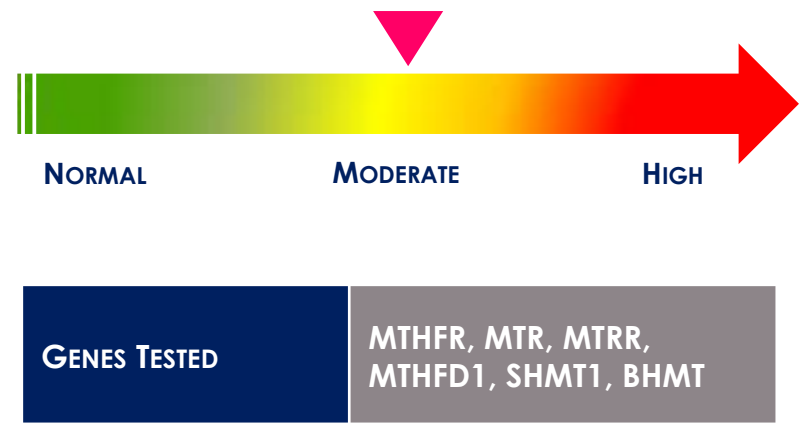
Vitamin B-6, also called pyridoxine, helps our body's neurological system to function properly, promotes red blood cell health, and is involved in sugar metabolism. Its found naturally in many foods, including beans, whole grains, meat, eggs and fish, as well as in fortified sources like breakfast cereals. Most individuals receive sufficient amounts of vitamin B6 from a healthy diet, and B6 deficiency is usually rare in many developed countries.

The genetic marker in the NBPF3 gene (near the ALPL gene) has been found in multiple studies to be associated with reduced levels of B-6, possibly due to faster than normal clearance of this vitamin from the bloodstream. The studies we report observed associations between vitamin levels and particular genotypes; however, that does not mean that your levels are out of balance. You should ensure that you are eating a healthy diet and discuss your results with your physician and/or nutritionist.

The recommended intake of vitamin B6 for most adults is 1.3 to 1.7 milligrams per day. Factors increasing ones need for vitamin B6 include depression, high homocysteine levels, cardiovascular disease, ADHD, asthma, cognitive decline and Alzheimer's disease, morning sickness, premenstrual syndrome, and certain medications, such as oral contraceptives and non-steroidal anti-inflammatories.

VITAMIN B9 (FOLATE) REQUIREMENT

ASSESSMENT CATEGORIES



Folate is found in many foods, such as green leafy vegetables like chard or kale, as well as beans, lentils, citrus fruits, nuts and fortified grains. This nutrient plays a role in protein metabolism, as well as gene expression, formation of blood cells and DNA repair.

Folate can lower the blood level of homocysteine, a substance linked to cardiovascular disease at high levels. Diets rich in folate have been associated with reduced risk of cardiovascular disease. Folate is particularly important early in pregnancy for preventing some birth defects. As such, pregnant women or women intending to become pregnant are advised an elevated recommended daily intake of 600 micrograms of folate. The recommended intake of folate for most adults is 400 micrograms per day. Factors in increasing folate needs include pregnancy, women trying to conceive, over 50s, gluten free and low gluten diets, cardiovascular disease and cognitive decline.

Bioavailability of dietary folate varies widely between 25-50%, due to certain compounds in foods, such as wholegrains and legumes, which inhibit folate absorption. Thus, naturally occurring folates are not as bioavailable as folic acid. The bioavailability of folic acid is 100% when taken as a supplement, while folic acid in fortified food is estimated to have about 85% bioavailability.

A relatively common variant in the MTHFR gene, known as C677T (rs1801133), has been associated with lowered folate and elevated homocysteine levels in the blood.

VITAMIN B12 REQUIREMENT

ASSESSMENT CATEGORIES



GENES TESTED	FUT2, CUBN, RASIP1, TCN1, MS4A3*, CLYBL*, FUT6*
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Vitamin B-12 plays an important role in how our brain and nervous system function. It helps to keep red blood cells healthy and is a critical component for synthesis and regulation of our DNA. Vitamin B-12 is found naturally in foods of animal origin including meat, fish, poultry, eggs and milk products. A healthy diet will typically provide sufficient B-12, although vegetarians, vegans, older people, and those with problems absorbing B-12 due to digestive system disorders may be deficient. Strict vegetarians or vegans can meet their requirements through taking yeast extracts and fortified cereals or via supplementation.

Symptoms of vitamin B-12 deficiency can vary, but may include fatigue, weakness, bloating, or numbness and tingling in the hands and feet. The recommended intake for adults is 2.4 micrograms per day. Multiple genetic studies have identified a marker in the gene FUT2 as being associated with lower levels of B-12 in the blood. This effect may be due to reduced absorption of B-12 in the gut. Eating B-12-fortified cereals can promote healthy levels of B-12, especially for those over the age of 50.

VITAMIN C REQUIREMENTS

ASSESSMENT CATEGORIES



GENES TESTED	SLC23A1, SLC23A2
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Vitamin C, also known as ascorbic acid, is not synthesized by human body. Therefore, we must obtain vitamin C through our diet. Vitamin C is an antioxidant and plays an important role in iron absorption, synthesis of collagen - a structural component of blood vessels, ligaments, bones and other tissues. Alterations in vitamin C levels have also been associated with a wide range of chronic complex diseases, such as atherosclerosis, type 2 diabetes and cancer. Deficiency of this vitamin is strongly linked with a disease known as scurvy.

The SLC23A1 and SLC23A2 genes play a major role in vitamin C metabolism. If you are a smoker, or under heavy physical stress, e.g. marathon runner or skier, you may be at higher risk for vitamin C deficiency. The recommended intake of vitamin C for most adults is 75 to 90 milligrams per day.

Boost your vitamin C intake by eating more fruits such as oranges, grapefruits, cantaloupes, kiwi, mango, papaya, pineapple, strawberries, raspberries, blueberries, cranberries and watermelon. Broccoli, brussel sprouts, cauliflower, green and red peppers, spinach, cabbage, turnip greens, sweet or white potatoes, and tomatoes are also good sources of vitamin C. The best food sources of vitamin C are uncooked or raw fruits and vegetables, as it is destroyed by cooking and heat. Lightly steaming your vegetables will lessen nutrient loss.

VITAMIN D REQUIREMENT

ASSESSMENT CATEGORIES



GENES TESTED	VDR, GC, CYP2R1, NADSYN1, CYP24A2
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Multiple genetic studies have identified a variant in the GC gene that codes for the vitamin D-binding protein that is associated with decreased blood levels of 25-hydroxyvitamin D, which is the major circulating form of vitamin D.

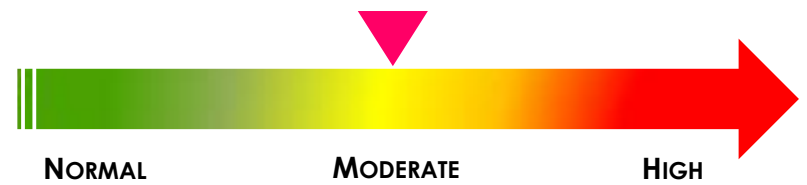
Vitamin D is different from other essential vitamins in that our bodies can manufacture it with sunlight exposure (ideally from 7:30-9:00 am for 20-30 min. on as much bare skin as possible). It helps to regulate the absorption of calcium and phosphorus in our bones and aid in cell to cell communication throughout the body. Its deficiency can lead to osteoporosis related fractures and health problems such as rickets.

Vitamin D is a fat-soluble vitamin and dietary sources include some fatty fish, fish liver oils, and milk or breakfast cereals fortified with vitamin D. Resistance exercise, such as lifting weights in the gym, is useful for promoting bone growth. Recommended intake of vitamin D for most adults is 600 IUs per day. About 115 IUs of vitamin D is found in one cup of vitamin D-fortified, non-fat, fluid milk.

There is a steady increase in cases of severe vitamin D deficiency mainly due to sun protection measures. Other factors contributing to vitamin D deficiency include environmental conditions (air pollution, geographical locations), as well as dark skin, older age, obesity, and genetic variations. Individuals may be susceptible to lower blood vitamin D levels due to reduced ability to transport vitamin D in the body.

VITAMIN E REQUIREMENT

ASSESSMENT CATEGORIES



GENES TESTED	ZPR1, SCARB1, CYP4F2, BUD13, NKAIN3, F5
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Vitamin E refers to a group of eight fat-soluble compounds that include both tocopherols and tocotrienols, out of which alpha-tocopherol is most abundant in the body. Vitamin E is an antioxidant that protects body tissue from damage caused by substances called free radicals.

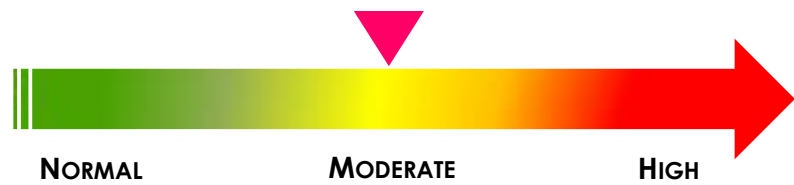
The body also needs vitamin E to help keep the immune system strong against viruses and bacteria, and regulate other metabolic processes. Vitamin E reduces the risk of life-threatening blood clots, acts as an anti-inflammatory, and offers protection from the sun. Vitamin E imbalances are relatively common, and are usually caused by diet, fat malabsorption disorders, and genetic variations.

Increased vitamin E levels are associated with decreased frailty and disability in old age. The recommended intake of vitamin E for most adults is 15 milligrams per day. Naturally-occurring sources of vitamin E include vegetable oils (soybean, corn, safflower, and cottonseed), nut like almonds, peanuts, hazelnuts, avocados, whole grains, and to a lesser extent in green leafy vegetables, such as spinach and broccoli. High doses of vitamin E supplements may increase risk of bleeding for those taking blood thinners, or with vitamin K deficiency. Do not exceed 1,000mg (1,490IU) per day without the supervision of your health professional.



VITAMIN K REQUIREMENT

ASSESSMENT CATEGORIES



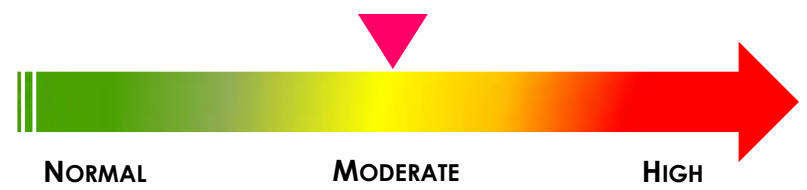
GENES TESTED	VKORC1, GGCX
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Vitamin K (including vitamin K1, phytonadione, and K2, menaquinone), is a group of fat-soluble vitamins that is essential for promoting healthy blood clotting and healthy bones. Low vitamin K intake increases the risk of excessive bleeding, mineralization of blood vessels, and risk of osteoporosis and fractures. Genetic variations contribute to vitamin K imbalance.

There is no fixed RDA, however, 90 to 120 µg is typically considered adequate. Green leafy vegetables such as spinach, kale, broccoli, lettuce, swiss chard and parsley are a good source of vitamin K1, with one cup of kale providing over 1,000 µg of vitamin K, approximately ten times the recommended minimum daily amount. Absorption of vitamin K1 is greater when consumed with a little bit of fat, such as vegetable oil, (e.g. extra virgin olive oil, canola oil). Vitamin K rich fruits include kiwifruit, blueberries, prunes, figs, and grapes. Fermented dairy products, such as yogurt and cheese, and fermented soy (miso paste and natto), provide vitamin K2, which is especially helpful in increasing bone density and reducing the risk of fractures. Animal sources of vitamin K include chicken, eggs, beef, lamb, shrimp, sardines, tuna, and salmon. Vitamin K is fairly stable as it is not destroyed by usual cooking methods or lost in cooking water.

CALCIUM REQUIREMENT

ASSESSMENT CATEGORIES



GENES TESTED	CASR, CARS, GCKR, DGKD, CYP24A1, GATA3, DGKH, WDR81, GC
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The RDA for adults is 1,000mg per day. It increases to 1,200mg per day for those over 50 years old. Apart from genetics, other factors that may increase chances of calcium deficiency include excessive alcohol consumption, premenstrual symptoms, vitamin D and magnesium deficiency.

Calcium is an essential mineral, and a major constituent of bones and teeth. It plays a central role in healthy functioning of your nervous system, controls muscle contraction, and secretion of hormones, such as insulin. Our bodies do not produce calcium, hence we must get it through dietary sources. Calcium deficiency may result in bone loss and osteoporosis.

Boost your calcium levels by consuming more milk and dairy products. If you are lactose intolerant, cheese and yogurt may still be options, as the fermentation process reduces lactose content. Calcium fortified milk contains up to 500-600mg calcium per serve. Other calcium rich sources include, fish with edible bones e.g. sardines and anchovies, beans and bean products, fortified soya milk, green leafy vegetables e.g. kai lan, chye sim, bok choy, calcium fortified cereals and bread.

As calcium requires vitamin D for absorption, you can optimize absorption by eating calcium rich foods with those containing vitamin D, e.g. vitamin D fortified cereal with calcium fortified soy milk, or calcium enriched bread with salmon. Dried herbs, such as nettle leaf (take as a tea), dill, basil, marjoram and thyme are other good sources of calcium.

MAGNESIUM REQUIREMENT

ASSESSMENT CATEGORIES



NORMAL

MODERATE

HIGH

GENES TESTED

MUC1, ATP2B1, DCDC5,
SHROOM3, MDS1, CANT1,
HOXD9, CASR,
INTERGENIC/LOC105370668

Magnesium is an essential mineral involved in numerous physiological processes including energy metabolism, functioning of nervous system, and blood pressure regulation. Magnesium is needed for strong bones and maintaining heart health. Deficiency in this mineral may be a factor in constipation, tension or migraine headaches, anxiety, depression, chronic fatigue and premenstrual syndrome. Magnesium deficiency has been associated with higher risk of osteoporosis, hypertension, cardiovascular disease, insulin sensitivity. RDA is typically 320 to 420mg.

Consume more magnesium rich foods, such as nuts (e.g. brazil nuts, almonds, cashews), seeds (e.g. pumpkin, sesame), avocados, oats and legumes, to boost your magnesium levels. Bananas and dark chocolate are also good sources. Supplemental magnesium, typically found as magnesium citrate, chelate or glycinate, is well absorbed. However, if you lead an active lifestyle, you may not be able to meet your magnesium requirements from oral supplements, as higher doses lead to diarrhea. In this case, magnesium oil as a topical spray is a good way to deliver higher doses of magnesium, without the side effects. Having a bath with epsom salts or magnesium chloride (available in flakes) is another way of boosting your magnesium levels.

IRON REQUIREMENT

ASSESSMENT CATEGORIES



GENES TESTED	TMRSS6, TFR2, TF, HFE H63D, HFE c282Y, SLC17A1
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Eating fruits and vegetables together with an iron rich meal will improve its absorption, as they contain vitamin C and organic acids. Foods high in iron include beef, poultry, oysters, fish and organ meats such as liver. Good sources of non-heme iron include beans, fortified cereals, spinach and other dark leafy greens.

Iron is an essential mineral, and a key component of hundreds of proteins, including oxygen-carrying hemoglobin in red blood cells, and myoglobin (found in muscle cells). Absorption, transport and storage of iron are tightly regulated as it is both essential, and potentially toxic. Iron deficiency is the most common nutrient deficiency in the world, leading to symptoms such as anemia, fatigue and palpitations. If you suffer from chronic infections, and often feel sluggish, weak, and unable to focus, insufficient iron levels may be a factor. Individuals following a vegetarian or vegan diet, and athletes typically have higher iron requirements. RDA is 8mg for men. Women have a higher requirement, at 18mg for 19-50 years old, and 8mg for women 51 years and over.

Iron comes in two forms - heme iron from animal sources, and non-heme iron from plants. Heme iron is absorbed more readily than non-heme iron. Vitamin C enhances absorption of non-heme iron, while wholegrains, legumes and nuts inhibit absorption by around 50% due to their phytate content. Polyphenols in coffee and tea may also reduce absorption. Calcium reduces absorption of both heme and non-heme iron. Optimize iron bioavailability from your diet by avoiding tea or coffee, and eating calcium rich foods together with iron rich meals.



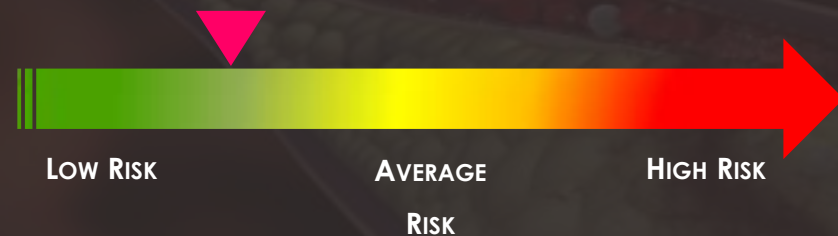
CARDIOVASCULAR HEALTH

Your metabolic health can be influenced by many genes. Your report includes genetic variants that measure your likelihood for having decreased HDL cholesterol levels, as well as elevated LDL cholesterol, blood sugar and triglyceride levels. All of these are indicators of adverse metabolic health, which are precursors to various health conditions, including coronary artery disease, stroke and type 2 diabetes. Your genetic results for these metabolic health factors are summarized below.

CARDIOVASCULAR HEALTH	
TRAIT	SAMPLE ASSESSMENT
ELEVATED LDL CHOLESTEROL	SLIGHTLY HIGH RISK
DECREASED HDL CHOLESTEROL	AVERAGE RISK
ELEVATED TRIGLYCERIDES	AVERAGE RISK
ELEVATED BLOOD SUGAR	HIGH RISK
DECREASED ADIPONECTIN LEVELS	SLIGHTLY LOW RISK
METHYLATION	AVERAGE RISK
DECREASED OMEGA-3 AND OMEGA-6	TYPICAL

ELEVATED LDL CHOLESTEROL

ASSESSMENT CATEGORIES



GENES TESTED	CELSR2, APOC1, LDLR, APOB, ABCG8, HMGCR, TRIB1, PCSK9, ZPR1, HNF1A, CETP, AND MORE...
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Eat a lot more fiber-rich foods (especially soluble fiber from foods like beans, oats, barley, fruits, and vegetables) and choose protein-rich plant foods (such as legumes or beans, nuts, and seeds) over meat.

Low-density lipoprotein (LDL) is the type of cholesterol that can become dangerous if you have too much of it. Like some sticky, greasy matter clogging up your kitchen drainage, LDL cholesterol can form plaque and build up on the walls of your arteries, making them narrower and less flexible, which then puts you at risk for conditions like heart attack or stroke. A genetic result of "High" or "Slightly High" does not mean you have elevated LDL cholesterol levels, but tells you that you may have a propensity for elevated LDL cholesterol levels. On the other hand, a result of "Low" or "Slightly Low" tells you that you have a lower than average likelihood for elevated LDL cholesterol levels.

- A genetic result of "High" is equivalent to a profile from the Framingham Heart Study who had elevated LDL cholesterol levels measuring, on average, above 189 mg/dl with approximately 25% of individuals measuring above 190 mg/dl.
- A genetic result of "Slightly High" is equivalent to a profile measuring, on average, above 130 mg/dl LDL with approximately 20% of individuals measuring above 160 mg/dl.
- A genetic result of "Average" means that you share a similar genetic profile with individuals measuring, on average, near-optimal LDL cholesterol levels.

DECREASED HDL CHOLESTEROL

ASSESSMENT CATEGORIES



GENES TESTED	LPL, LIPC, ZPR1, ABCA1, PLTP, FADS1, GALNT2, APOC1, TRIB1, HNF4A, CETP, ANGPTL4, AND MORE...
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High-density lipoprotein (HDL) cholesterol is known as good cholesterol, because high levels of HDL cholesterol seem to protect against heart attack, while low levels of HDL cholesterol (less than 40 mg/dL) increase the risk of heart disease. Although multiple mechanisms are known to account for this, the major one is thought to be the role of HDL in transporting excess cholesterol away from the arteries and back to the liver, where it is passed from the body.

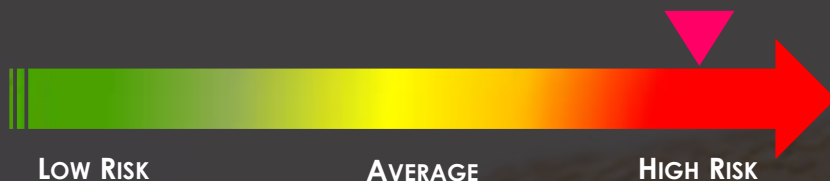
In men, typical HDL cholesterol levels range from 40 to 50 mg/dl. In women, female hormones cause typical HDL cholesterol levels to range from 50 to 60 mg/dl; however, after menopause there is a tendency for decreased HDL cholesterol levels.

- A result of "High" is equivalent to profiles of individuals from the Framingham Heart Study who had decreased HDL cholesterol levels measuring, on average, below 45 mg/dl with approximately 40% of individuals measuring below 40 mg/dl.
- On the other hand, a result of "Slightly Low" is equivalent to profiles of individuals measuring, on average, above 45 mg/dl HDL cholesterol with approximately 30% of individuals measuring above 50 mg/dl HDL cholesterol.

Foods rich in colors red and purple (plums, grapes, red cabbage, eggplant, raspberries) may both raise HDL (good) cholesterol and lower LDL levels. Try to increase your intake of health fatty fish like salmon to at least twice a week.

ELEVATED TRIGLYCERIDES

ASSESSMENT CATEGORIES



LOW RISK

AVERAGE

HIGH RISK

RISK

GENES TESTED

ZPR1, GCKR, LPL, MLXIPL, TRIB1, ANGPTL3, SUGP1, TIMD4-HAVCR1, APOA5, FADS1, CAPN3, AND MORE...

Triglyceride is the chemical term for fat as it is stored in your body. Individuals with elevated triglycerides are at risk of conditions, such as coronary artery disease or type 2 diabetes. Having higher triglycerides is often associated with poor lifestyle choices, such as lack of exercise, excessive alcohol consumption, smoking, excessive refined carbohydrate consumption and being overweight.

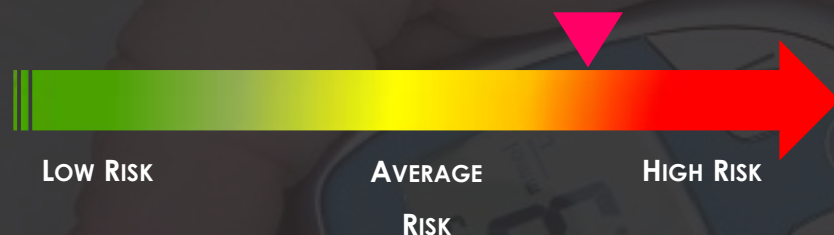
A normal triglyceride level is under 150 mg/dl. Triglyceride levels in the range of 150 to 199 mg/dl are defined as borderline-high, with over 200 mg/dl considered high and over 500 mg/dl very high. A genetic result of "High" or "Slightly High" does not mean you have elevated triglyceride levels, but tells you that you may have a propensity for elevated triglycerides levels. On the other hand, a genetic test result of "Low" or "Slightly Low" tells you that you have a lower than average likelihood for elevated triglyceride levels.

- A genetic result of "High" means that you share a similar genetic profile with individuals from the Framingham Heart Study who had elevated triglyceride levels measuring on average above 150 mg/dl with approximately 30% of individuals measuring above 200 mg/dl.

Moderate to high intensity aerobic exercise can lower triglycerides by up to 10-20%. Reduced alcohol intake may improve triglycerides as well, especially if there is an issue with excessive intake or individual predisposition to high triglycerides.

ELEVATED BLOOD SUGAR

ASSESSMENT CATEGORIES



Elevated blood sugar is a health condition that results from higher than normal levels of sugar in the blood plasma. High blood sugar levels are measured as a reading greater than 140 mg/dl or a fasting plasma glucose level of greater than 100 mg/dl. High blood sugar levels often indicate a condition called insulin resistance and can lead to type 2 diabetes.

➤ A genetic result of "High" means that you share a similar genetic profile with individuals exhibiting elevated fasting plasma glucose levels. The corresponding fasting plasma glucose levels are associated with an increased likelihood for future development of type 2 Diabetes.

You can often lower your blood glucose level by exercising. However, if your blood glucose is above 240 mg/dl, check your urine for ketones. If you have ketones, do not exercise. Exercising when ketones are present may make your blood glucose level go even higher. You'll need to work with your doctor to find the safest way for you to lower your blood glucose level

Cutting down on the amount of food you eat might also help. Work with your dietitian to make changes in your meal plan.

GENES TESTED

TCF7L2, GCK, GCKR, GLIS3, SLC2A2, SLC30A8, MTNR1B, ADCY5, ADRA2A, G6PC2, CRY2, MADD, CDKAL1, AND MORE...

DECREASED ADIPONECTIN LEVELS

ASSESSMENT CATEGORIES



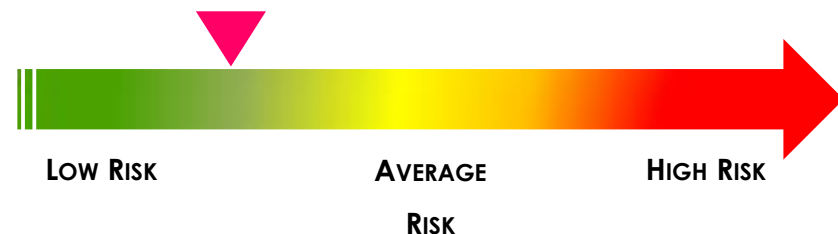
GENES TESTED	CDH13, ADIPOQ, CMIP, GNL3, PBRM1, PEPD, PPARG, ATP6V0A2, TRIB1, VEGFA, LYPLAL1, PDE3A, ARL15
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The body can store extra energy as fat in adipose tissue - a loose connective tissue mainly composed of cells called adipocytes. It is mainly located beneath the skin (subcutaneous fat) and around the internal organs (visceral fat). Visceral fat accumulation is associated with insulin resistance, high blood pressure, high levels of triglycerides, low levels of HDL-cholesterol, small dense LDL particles, and increased risk of diabetes and cardiovascular disease.

Fat cells are biologically active, produce and secrete important biologic substances like adiponectin, and their function or dysfunction may affect our health in many ways. Studies show that low levels of adiponectin are associated with raised levels of several different markers of inflammation. Obese people have lower blood levels of adiponectin than normal weight individuals. Low adiponectin levels are more strongly associated with the amount of visceral fat than subcutaneous fat. Several clinical studies have shown that low production of adiponectin correlates with the development of insulin resistance and type 2 diabetes. Conversely, reduction of obesity increases adiponectin levels. Low plasma levels of adiponectin have also been associated with Non-alcoholic fatty liver disease (NAFLD), many forms of cancer and cardiovascular diseases. Individuals with a “High” or “Slightly High” risk are therefore advised to compensate for that risk through appropriate diet and exercise.

METHYLATION

ASSESSMENT CATEGORIES



GENES TESTED	MTHFR, MTR, MTRR, MTHFD1, CBS
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Methylation means "adding a methyl group." It is a chemical modification important for:

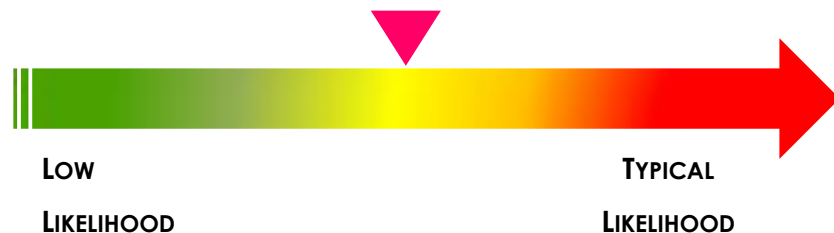
- Producing the active form of folate, called methylfolate
- Epigenetics, the control of gene activity without direct changes in the DNA sequence, whereby your genes are marked with methyl groups (DNA and histone methylation)
- The metabolism of hormones and neurotransmitters

When optimal methylation occurs, it has a significant positive impact on many biochemical reactions in the body that regulate the activity of the cardiovascular, neurological, reproductive, and detoxification systems, including those relating to: DNA production, Histamine metabolism, Fat metabolism, Liver health, among others. The MTHFR gene produces an enzyme that affects methylation and folate metabolism. Because methylation and folate are important for immune balance, mutations inside the MTHFR gene can predispose you to allergies, especially if you are low in methylfolate or consume synthetic folic acid.

To enhance methylation, in addition to a healthy, whole-food, non-processed food diet, make sure you are eating asparagus, avocado, brussels sprouts, brocolli, green leafy vegetables, legumes (peas, beans, lentils). In addition, engage in regular physical exercise, avoid smoking and excessive alcohol or coffee consumption.

DECREASED OMEGA-3 AND OMEGA-6 LEVELS

ASSESSMENT CATEGORIES



GENES TESTED	FADS1, FADS2, IL6, TNF
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Omega-3 and Omega-6 are referred to as essential fatty acids needed by our bodies to maintain health and vital functions. Most sources of Omega-6 can be found in our daily diets, while Omega-3 may be taken as a supplement as we don't produce these naturally. Omega-3 is anti-inflammatory, helps to lower blood fats, reduce inflammation in our blood vessels and joints, and help reduce rheumatoid arthritis. Whereas, Omega-6 is pro-inflammatory and excess consumption may lead to certain medical conditions, along with depression. A high Omega-6 : Omega-3 ratio can contribute to excess inflammation, potentially raising the risk of all sorts of diseases.

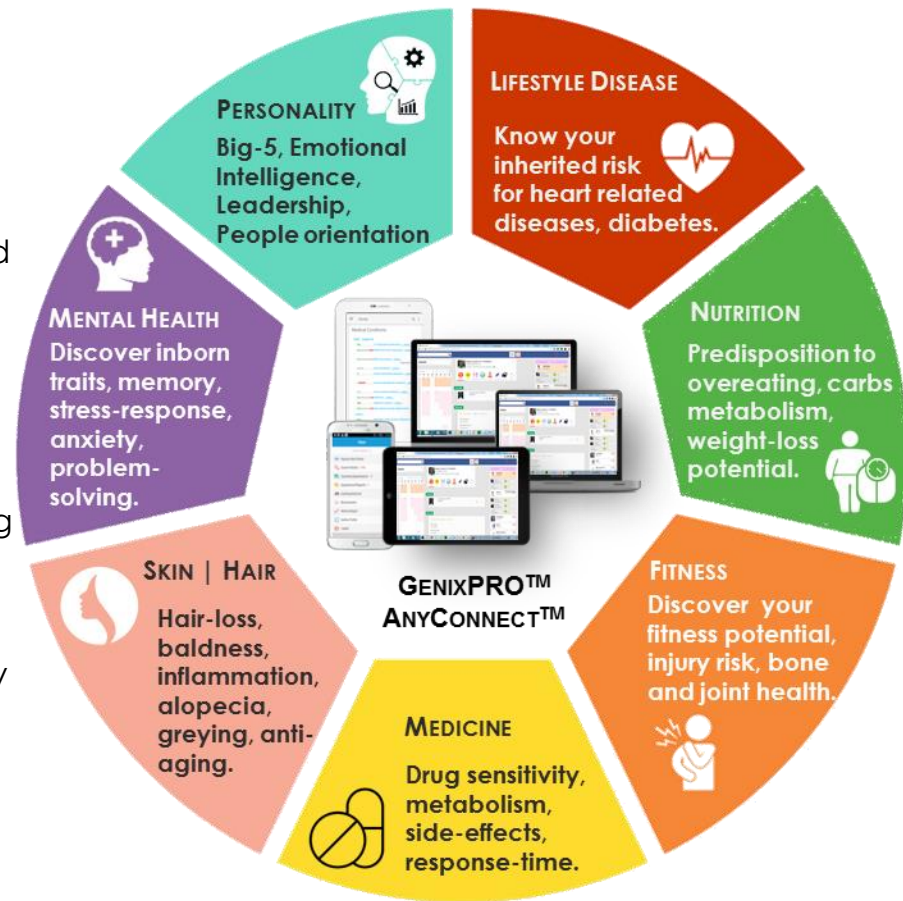
We test for genes that can influence your body's inflammation levels and make recommendations about your individual need for dietary Omega-3s. Those with a higher natural inflammation response are advised to increase their daily allowance of Omega-3s and strictly monitor Omega-6 consumption in processed foods. Plan to eat at least 2-5 servings of Omega-3 rich foods per week. Oily fish such as Salmon, Sardines, and Mackerel are a great source of Omega-3's. Walnuts and Flaxseed are also extremely rich sources of Omega-3 – a tasty way to dress your salads!

WHAT'S NEXT – ACTION PLAN

In your endeavor towards self-discovery, we hope that you found this supplemental reading insightful and interesting. So, now that you have a better understanding of your body's nutrigenomic profile, what can you do with this information?

With this report you're now equipped with the most advanced knowledge available for your personalized weight management, and we want to help you make the most of it to maximize your potential. We offer a selection of bespoke nutrition/diet consultations for whatever your goal may be, from optimizing diet for the next upcoming Marathon to natural weight-reduction. Our team of accredited nutrition and fitness practitioners will be happy to assist you in designing and implementing the right diet and weight-loss programs individually tailored exactly to your genetic results, taking in to account all of the areas we test for. Once the optimal diet type baselines are set, we will further personalize by constantly evaluating the genetic contribution of relevant diet and lifestyle choices in relation to new research made available periodically.

Please visit www.GENIXPRO.com, call **GENIXPRO™** [Customer Service](tel:18001234567) or email ehs@genixpro.com to find out more about our bespoke DNA-based weight-management programmes.



The scientific studies referenced in this report are provided below and can be referenced at www.pubmed.gov and other repositories. All of these papers were published in peer-reviewed journals. PubMed is a service managed by the National Institutes of Health (NIH), a part of the U.S. Department of Health and Human Services, and it tracks more than 19 million citations for biomedical articles and scientific research.

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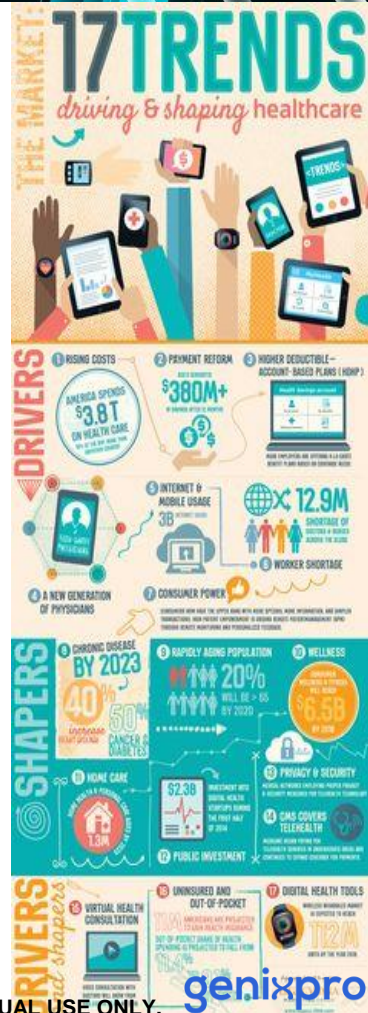
UNLOCKING YOUR WEIGHT-LOSS POTENTIAL BLUEPRINT

Our individual genetic profile in combination with our diet, lifestyle and environment dictates our health and wellness. Now and into the future. Yet, knowing ourselves holistically remained a mystery - thus far. Your individual results presented in this report unlock your innate health and wellness potential.

Our molecular diagnostics lab ran tests to determine your sample response to a pre-selection of key genes associated with diet, nutrition and weight management. This isn't yet another diagnostic lab test. Armed with your GENIXPRO™ results, it now becomes possible for you to integrate genetics as a powerful new dimension in your endeavor for optimum health and fitness, allowing you to further define your own ideal activity and nutrition plan. To help you learn more about your results in comparison with the broader genetic landscape, we've enclosed in Appendix section our GENIXPRO™ Genotype Support Guide, a basic description of genetic science terminology and the role genetics can play in determining our personal well-being as well as our ability to lose weight. We strongly encourage you to read the science behind the story before proceeding.

GENETICALLY GUIDED WEIGHT-LOSS PROGRAMS. PERSONALIZED.

Understanding personal genetics is the exciting new frontier in health and fitness. To accomplish your health or body goals, it is therefore extremely important to make the right choices that best complement your unique genetic composition and metabolic health. More importantly, our genes don't change, so this report contains information that you can use for a lifetime. By helping understand how your genetic profile affects you, GENIXPRO™ provides unique insights and knowledge to help you make informed nutrition and diet choices.



genixpro =



**PERSONALIZED
WELLNESS**

GENOMICS

CLINICAL

LIFESTYLE

UNDERSTANDING GENETICS

To best understand the GENIXPRO™ report and your results, please take a moment to read this background information on personal genomics. The GENIXPRO™ NUTRITION report is designed for a variety of individuals. Whether you are an absolute beginner just wanting to optimize your diet plan, a nutritionist or dietician keen to offer the very best advice to your clients, or a professional athlete seeking that extra edge, our report can help you.

WHAT ARE GENES?

A gene is the basic physical and functional unit of heredity. Genes are made up of DNA, and act as instructions to make molecules called proteins. In humans, genes vary in size from a few hundred DNA bases to more than 2 million bases. It is estimated that humans have nearly 25,000 genes. Each gene is comprised of multiple combinations of four letters that make up your genetic code: A, T, C, and G. Every person has two copies of each gene, one inherited from each parent. Most genes are the same in all people, but a small number of genes (less than 1 percent of the total) are slightly different between people. Alleles are forms of the same gene with small differences in their sequence of DNA bases. These small differences contribute to each person's unique physical features. Increasingly, your genes can also tell you whether you are predisposed to specific health risks, your medicine response etc.

WHAT ARE GENE VARIATIONS?

With the exception of identical twins, all individuals have minor differences in the information that their DNA contains and it's these differences that make each of us unique. Gene variations are slight changes in the genetic code that are present in at least one percent of the population.

For example - one genetic "letter" (A, T, C, or G) may be replaced by another. These variations can lead to different processes in the body, just as altering one letter in a word can completely change its meaning. When the variation affects only one genetic letter [think of **G**et vs. **S**et] it is called a "single nucleotide polymorphism" (or SNP, pronounced "snip"). You'll notice which of these SNP's you possess under the "Allele Result" in each gene table in this report.

ARE GENE VARIATIONS "BAD"?

For a given population, one genetic code for a gene may be found more frequently than other genetic codes for that same gene. The genetic codes for those genes that appear less frequently are referred to as "variants". Variations should not be thought of as "good" or "bad," rather genetic variations are simply the differences in the forms of the genes present in our bodies. The key is to know which form of the gene you carry, so that you can make the right exercise, dietary and lifestyle choices to minimize potential health risks.

NUTRITION + GENETICS = NUTRIGENETICS?

Nutrigenetics is the scientific study of the effects of our individual genetic variations in response to our diet, exercise and lifestyle choices, all of which can cause the genes to be "expressed" in a favorable or unfavorable way. Nutrigenetics enables us to identify the way-forward on our journey towards maximizing our individual, optimal health potential.

UNDERSTANDING GLYCEMIC LOAD AND GLYCEMIC INDEX

There are many ways to measure how and what we eat, and the different kinds of “**diet**” available can be very confusing. At GENIXPRO™ we use the Glycaemic Load (GL) scale as a starting point to help measure not only the type of carbohydrate you consume, but also the total amount.

The GL scale is effectively an evolution of the Glycaemic Index (GI). This is a rating scale that marks the carbohydrate content of a food on a scale from 0 to 100. Foods are ranked according to how much they raise blood-sugar levels after eating - i.e how quickly they are broken down in to glucose during digestion. High GI foods are digested and absorbed quickly, which can result in large and often harmful spikes in blood sugar levels. Low GI foods however are digested and absorbed more slowly, keeping blood sugar levels steady. However, GI does not take in to account the amount of these foods, this is where Glycaemic Load (GL) comes in. Taking into account both the GI of a food, and the amount of carbohydrate content per 100g of this food, the GL to allows a better overall means of dietary guidance.

The higher the Glycemic Load, the greater the increase in blood sugar.

So, to help maintain long-term health, aim to consume foods with a lower GL to keep your blood sugar levels stable. The total daily GL you should aim for, however, is affected by your individual genetic variants that lower or increase your carbohydrate sensitivity.

UNDERSTANDING GLYCEMIC LOAD AND GLYCEMIC INDEX

Some general tips for following a low-GL diet:

- Always consume whole grains. The fibrous coat of the hull or skin from grains slows down the digestion and absorption of carbohydrates. E.g. Brown rice – this has a much lower GI than white rice.
- Some foods may have a relatively low GI on their own, but are normally served in unnecessarily large portions (Pasta, for example) and as such result in a high GL. You may want to monitor your portion size of such foods.
- Aim to eat 'whole' foods - those that are as close to their natural state as possible.

CONTROLLING BLOOD SUGAR LEVELS | BENEFITS

Lower risk of Type-2 Diabetes

Lower risk of cardiac disease

Stay fuller, for longer.

Reduce sweet cravings

UNDERSTANDING GLYCEMIC LOAD AND GLYCEMIC INDEX

FOOD TYPE	GI SCORE	SERVING SIZE (GRAMS)	GL SCORE
BAKERY PRODUCTS AND BREADS			
WHOLE WHEAT BREAD, AVERAGE	71	30	9
100% WHOLE GRAIN™ BREAD (NATURAL OVENS)	51	30	7
WHITE PITA BREAD	68	30	10
WHEAT TORTILLA	30	50	8
BREAKFAST CEREAL			
ALL-BRAN™	55	30	12
MUESLI	66	30	16
GRAINS			
COUSCOUS	65	150	9
QUINOA	53	150	13
BROWN RICE	50	150	16
DAIRY PRODUCTS AND ALTERNATIVES			
SKIM MILK	32	250 ml	4
LOW-FAT FRUIT YOGURT	33	200	11
FRUITS			
APPLE	39	120	6
ORANGE	40	120	4

UNDERSTANDING GLYCEMIC LOAD AND GLYCEMIC INDEX

FOOD TYPE	GI SCORE	SERVING SIZE (GRAMS)	GL SCORE
PASTA AND NOODLES			
FETTUCINI, AVERAGE	32	180	15
WHOLEMEAL BOILED SPAGHETTI	42	180	17
SNACK FOODS			
RICE CAKES	82	25	17
HUMMUS (POPULAR CHICKPEA DIP)	6	30	0
VEGETABLES			
BOILED WHITE POTATO, AVERAGE	82	150	21
GREEN PEAS	51	80	4
CARROTS	35	80	2

**Want to find out the GL score of more foods? Just search online for "GL Food Table"*

GLYCEMIC INDEX RESEARCH UNIT (GIRU)

NUTRIENTS, WEIGHT MANAGEMENT AND GENETICS

New studies continue to emerge that demonstrate links between nutrients and genetics that show benefits in health and weight loss. Some of the benefits that scientists observe in relation to genes are listed below. Note: The genes and associated benefits listed below are not part of your genetic test. The content on this page is informational.

NUTRIENT	POTENTIAL HEALTH BENEFITS	ASSOCIATED GENES
RESVERATROL	Weight Loss, Reduce Weight Gain	SIRT1, PPARA, PPARG, ER
POLYPHENOLS (TEA)	Reduce Weight Gain	PPARG
CONJUGATED LINOLEIC ACID (CLA)	Fat Burning, Weight Loss	PPARA, PPARG
ISOPRENOLS (FARNESOL)	Weight Loss	PPARA, PPARG
ABIETIC ACID	Weight Loss	PPARG
CAPSAICIN (HOT PEPPER)	Weight Loss, Anti-inflammatory	PPARG
PHYTOL (CHLOROPHYLL)	Weight Loss	PPARA
AURAPTENE (CITRUS)	Weight Loss	PPARA, PPARG
ISOHUMULONE (HOPS)	Weight Loss	PPARA, PPARG

NUTRIENT	POTENTIAL HEALTH BENEFITS	ASSOCIATED GENES
GUGGULSTERONE (GUGLE)	Weight Loss	Farnesoid X Receptor
SOY/GENISTEIN	Weight Loss	Steroid Receptors: Estrogen, Androgen, Progesterone
DIOSGENIN	Weight Loss	Steroid Receptors: Progesterone
GINSENG	Weight Loss	Steroid Receptors: Estrogen
HYPERFORIN	Weight Loss	Pregnane X Receptor
ALPHA-LIPOIC ACID	Reduction of Overeating	AMPK Inhibitor
ANTHOCYANINS (PIGMENT)	Overall Health Benefit	ADIPOQ
LICORICE LFO (POLYPHENOLS)	Overall Health Benefit	FA synthase
POMEGRANATE EXTRACT (LENOLENIC ACID)	Overall Health Benefit	b-oxidation/PPARA

YOUR OVERALL NUTRIENT RECOMMENDED DAILY ALLOWANCE

Here is a summation of all the key vitamins, minerals and nutrients we are able to recommend based on individual genetic results, and how they compare to the current recommended FDA guidelines. Where both columns match, your genes show no need to increase intake above the normal recommended daily allowance.

NUTRIENT	RECOMMENDED DAILY ALLOWANCE	SAMPLE GOAL PER DAY
VITAMIN B1	1.2 mg	1.2 mg
VITAMIN B3	18 mg	18 mg
VITAMIN B5	5 mg	5 mg
VITAMIN B6	1.5 mg	10 mg
VITAMIN B7	30 µg	30 µg
VITAMIN B9	400 µg	400 µg
VITAMIN B10	25 mg	25 mg
VITAMIN B12	2.4 µg	15 µg
VITAMIN A	2,350 IU / (700 µg)	5,000 IU / 1,500 µg
VITAMIN C	85-105 mg	250 mg
VITAMIN D	600 IU / (15 µg)	800 IU / 20 µg
VITAMIN E	15 IU / (13.5 mg)	200 IU / 180 mg
VITAMIN K	140-170 µg	140-170 µg
INOSITOL	30 mg	30 mg
CHOLINE (VIT J)	200 mg	200 mg

NUTRIENT	RECOMMENDED DAILY ALLOWANCE	SAMPLE GOAL PER DAY
FIBRE	25 g	28 g
OMEGA-3	1.6 g	1.6 g
CHROMIUM	30 µg	30 µg
CALCIUM	1,000 mg	1,300 mg
SELENIUM	75 µg	75 µg
PHOSPHORUS	700 mg	700 mg
IODINE	150 µg	150 µg
IRON	14 mg	14 mg
MAGNESIUM	240 mg	240 mg
POTASSIUM	3.9 g	3.9 g
SODIUM	2.4 g	2.2 g
COPPER	0.9 mg	0.9 mg
ZINC	11 mg	11 mg
CAFFEINE	300 mg	300 mg
SATURATED FATS	22 g	22 g

GLOSSARY

AEROBIC: Anything relating to, involving, or requiring oxygen. E.g. “Aerobic exercise”

ALLELE: An allele is an alternative form of a gene (one member of a pair) that is located at a specific position on a specific DNA chromosome. E.g. “You have the I/I allele of the ACE gene.”

ANTI-OXIDANT: A substance, such as vitamin E, vitamin C, or beta-carotene, thought to protect body cells from the damaging effects of oxidation.

CRUCIFEROUS VEGETABLES: Relating to or denoting plants of the cabbage family.

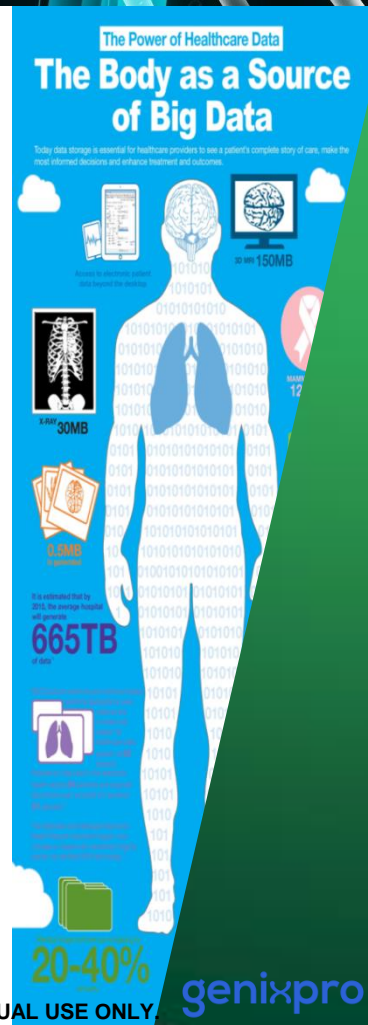
ENDURANCE: A sport or activity that requires the ability to perform for long periods of time at low intensities, such as marathon running and cross-country skiing.

FREE RADICAL: An atom or group of atoms that has at least one unpaired electron and is therefore unstable and highly reactive. In human tissue, free radicals can damage cells and cause health problems.

FOLATE: A salt or ester of folic acid.

FOLIC ACID: Part of the B complex of vitamins, found especially in leafy green vegetables, liver, and kidney.

GENOTYPE: The genetic constitution of an individual organism.



GLOSSARY

HCA (HETEROCYCLIC AMINES) AND PAH (POLYCYCLIC AROMATIC HYDROCARBONS): Possibly harmful chemicals formed when meat is cooked at high temperatures.

LIPID: Any of a group of organic compounds, including fats, oils, waxes, sterols, and triglycerides, that are insoluble in water.

MICRONUTRIENT: A substance such as a vitamin or mineral, that is essential in small amounts for our body's health and growth.

MONOUNSATURATED FATTY ACIDS: A type of fat that has only one double bond per molecule, they are mostly liquid at room temperature but can turn solid when chilled. E.g. Olive Oil

NUTRIGENETICS: A branch of nutritional science, which investigates the effect of genetic variations on the individual response to nutrients and other dietary components.

OSTEOPOROSIS: A medical condition in which the bones become brittle and fragile from loss of tissue, typically as a result of hormonal changes, or deficiency of calcium or vitamin D.

POLYUNSATURATED FATTY ACIDS: A type of fat that has more than one double bond per molecule, they are typically liquid both at room temperature and when chilled.

POWER: A sport or activity that requires the ability to perform at a high intensity for short periods of time, such as sprinting and power lifting.

TENDINOPATHY: A chronic or acute injury to a tendon, such as the Achilles tendon, often also referred to as tendonitis.

