Your Sign In Information

Web Address

https://genetics.healthyhabitsmc.com/access

Email

jane.doe@example.com

You will be required to set a password
so that you may sign in to the system.

2 Slim

PERSONAL REPORT

Prepared for: Jane Doe

Welcome to Your H2 Slim Personal Report

H2 Slim Personal Report

March 9, 2018

Congratulations! You are about to receive insights about your body that, up until now, have never been available. The science of the human body only recently evolved enough to allow scientists to identify and analyze a person's DNA. Your report not only provides you with a roadmap of your specific genes, but gives direction on how you can potentially optimize your health and well-being with this knowledge.

We spend a lifetime trying to learn more about ourselves, especially how our body works and how our health is affected by our habits and behaviors. Traditionally, we have learned what works and what doesn't through trial and error. *But experience alone doesn't always give us the information we need. Your report will help you to better understand the factors that can affect how your body ticks.*

This report will provide you with results in 4 key areas that can affect the way your body looks and feels. Your report includes an analysis of your genotype for certain key genes that are related to weight management, nutrition and exercise.

What is Genetic Testing?

Genetic testing utilizes a physical specimen from the body (saliva, blood, or other tissues) to reveal information about a person's chromosomes or their genes. In addition to identifying key genes, information is evaluated about areas on each gene that may differ between people. These areas are known as single nucleotide polymorphisms (SNPs). We use the term genotype to describe the outcome of your individual genetic tests.

Which Body Traits Were Analyzed?

To produce your results we look at genes that are related to four major categories: *Weight Loss Ability, Macronutrients in the Diet, Micronutrients in the Diet and Response to Exercise*. Some of the results are directly related to weight loss efforts from diet and exercise. Other results are relevant because they can affect how you feel and how your body functions optimally. This can affect your performance and your efforts to manage your body weight.

How Are Your Results Determined?

We provide a genetic analysis that indicates which gene combinations you have in each category. You will receive a rating based on our calculated score for each trait in a category. Some categories only have one gene associated with that trait; other categories have several genes associated with that trait. Our calculated score reflects the potential combined influences from one or more genes.

We also provide personalized health tips based on the potential implications of these results. In most cases, the outcomes

for a genotype are a response to a specific diet or exercise prescription. For example, many of the results are based on looking at study subjects' response to an exercise program where participants did cardio exercise on only three days per week for a certain amount of time each session. Participants may have differed in their response to this regimen based on their genetics. Some may have had better weight or fat loss results than others. If your results suggest a more unfavorable response, be careful of assuming that this suggests that you cannot lose weight from exercise or from a certain diet. You may simply need a slightly different approach to get more favorable results. In some cases, it is unclear exactly what the ideal approach might be. But we have evaluated your potential genetic response and provided suggestions on how to enhance it based on evidence-based dietary and exercise research recommendations, as well as the experience of our medical team.

Your report uses the best available research on which to base your results. We have established stringent criteria for studies that can be used to help us evaluate the potential impact of your genotype for each gene tested. There are many studies that include genetic analyses, but for a variety of reasons, not all of them are reliable or valid. In determining how to process your genetic analysis, we do not accept just any research that has been performed on a gene. We use the largest and most scientifically valid genome-wide association studies to calculate a score for the different genes or gene combinations. It's important to keep updating the analyses as the science evolves. Your report maintains a continually updated research database, and our analyses are modified as new and better research becomes available. There is still much to learn in the field of genetic analysis. We chose the best available research upon which to base our analysis and recommendations.

Why Is Your Genotype Important?

Your genotype reveals the blueprint for your body. The ratings we provide reflect your genotypes for each gene or set of genes. This shows you your potential response, based on your genetic analysis, to different aspects of body weight management (e.g., how you might be affected by different types of diets and regular exercise.) Keep in mind that if your results show the presence of certain genotypes and your result suggest that you will exhibit either an "enhanced" or "below average" response, for example, this does not mean that the outcome associated with that genotype is definitely how your body will or does react.

Your phenotype is the physical manifestation, or expression, of your genotype. But your phenotype may be different than your genotype—not all the genetic variations seen in an analysis are manifested. That's because **how the genes that you have are expressed is largely affected by your lifestyle and other environmental factors.** While your analysis might show that you have an increased or decreased potential for a certain health trait, it does not mean that you will, in fact, express that trait. Your phenotype for the trait may be different than the genotype the analysis shows.

This is very important to keep in mind because there is a tendency to view genotype results as a definitive diagnosis and to assume that you absolutely have certain traits, when this is not what a genetic analysis measures. The analysis only measures your risk for different outcomes, or the likelihood that your phenotype will express what your genotype predicts. Your results only suggest that there is a greater or lesser chance that you may exhibit certain traits or responses. The fields of nutrigenomics and exercise genomics are new, but growing, areas of research. Much still needs to be known to understand about genes and their interactions with each other, and the role in which other influences such as diet, exercise and the environment play in whether you will express a trait associated with a certain genotype.

That said, results from a genetic analysis may provide insights into how your body might perform optimally. If you have a certain genotype for a specific trait, knowing how it might affect you and adjusting your behaviors to maximize this information could make a difference in getting better results from lifestyle changes such as diet and exercise. *We provide personalized suggestions that may help you achieve the best results from your weight management efforts.* Our team considers the results of your genetic analysis, along with an analysis of personal factors that you report which may also influence your body weight, as well as evidence-based guidelines that suggest the most effective strategies for weight management. All of this information combined is used to determine which lifestyle behavioral changes may be most helpful to you.

What You'll Learn About Your Body

On the following pages, you will see a summary of your results. You'll learn what your genotypes suggest about your ability to lose weight and body fat in response to different types of diets and exercise programs. You will also gain insights into your potential status for a variety of micronutrients, as well as the likely health effects you may experience from regular exercise. Your analyzed genotype results are followed by a detailed explanation and success strategy. Our medical team has evaluated your potential response and taken in to account what evidence-based research recommendations on diet and exercise suggest are the optimal approach for effective body weight management to provide you with concrete success strategies. This guidance may give you that extra edge in finding the right plan that helps you maximize the results you get from dieting and exercise. While we can't change our genes, we can change our behaviors to take advantage of what our genes say about our bodies.

REPORT SUMMARY

WEIGHT LOSS ABILITY

FOOD

NUTRIENTS

EXERCISE

REPORT SUMMARY

WEIGHT LOSS ABILITY

Weight Loss Ability With Diet And Exercise	BELOW AVERAGE	FTO, TCF7L2, MTNR1B, PPARG, BDNF, ABCB11

FOOD

Protein Utilization	SLIGHTLY ENHANCED	FTO
Fat Utilization	NORMAL	PPARG, TCF7L2, APOA5, CRY2, MTNR1B, PPM1K
Carb Utilization	NORMAL	IRS1

NUTRIENTS

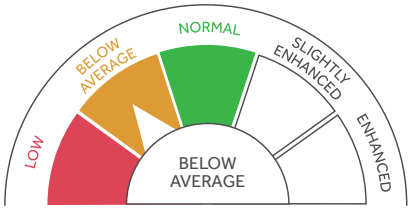
Vitamin B9 – Folate Tendency	BELOW AVERAGE	MTHFR
Vitamin A Tendency	BELOW AVERAGE	BCMO1
Vitamin B6 Tendency	LOW	NBPF3
Vitamin B12 Tendency	NORMAL	FUT2
Vitamin C Tendency	NORMAL	SLC23A1
Vitamin D Tendency	NORMAL	GC, NADSYN1, CYP2R1

EXERCISE

Fat Loss Response To Cardio	BELOW AVERAGE	ADRB2, LPL
Fitness Response To Cardio	BELOW AVERAGE	AMPD1, APOE
Body Composition Response To Strength Training	BELOW AVERAGE	NRXN3, GNPDA2, LRRN6C, PRKD1, GPRC5B, SLC39A8, FTO, FLJ35779, MAP2K5, QPCTL-GIPR, NEGR1, LRP1B, MTCH2, MTIF3, RPL27A, EC16B, FAIM2, FANCL, ETV5, TFAP2B
Hdl Response To Cardio	ENHANCED	APOE
Glucose Response To Cardio	ENHANCED	PPARG
Insulin Sensitivity Response To Cardio	ENHANCED	LIPC

WEIGHT LOSS ABILITY

WHAT YOUR GENES SAY ABOUT YOU:



Our analysis indicates that your genetic profile is rated **BELOW AVERAGE** for Weight Loss Ability. Your score reflects the fact that among the genes investigated, you had a few of the unfavorable gene combinations that could make you slightly resistant to both losing weight and keeping it off. This means that, compared to someone else with a more favorable genotype, *you might lose less weight than someone else with a different genotype when you make lifestyle changes by cutting calories in your diet and by burning extra calories when you exercise*. This result also suggests that you may be at a slightly higher risk of later regaining the weight you lose compared to someone else with a more favorable genotype.

Your genetic profile indicate that your weight loss ability is BELOW AVERAGE.

You may lose slightly less weight or body fat than expected from a lifestyle intervention. So make sure to choose a well-designed plan and employ strategies to stick with it for the long term.

Does this result mean that you cannot lose weight? Absolutely not! Remember that these results only indicate your potential based on genetic factors, but many other factors also affect the outcome. Even if you have the genotypes that may decrease your ability to lose weight, whether those genes are expressed or not depends upon diet, exercise and environmental influences. However, your results do suggest that it may be a good idea to employ strategies that will maximize your results.

SUCCESS STRATEGIES

Weight loss comes from reducing the number of calories you eat and increasing the number of calories that you burn from exercise. The most powerful — and permanent — weight loss comes when you do both. Choose a plan that is most likely to work for you. Following the suggestions from the genetic analysis of your Food and Exercise genes can help you identify foods and a fitness plan that may make it easier o lose weight. Different approaches work for different people. Here are some diet and exercise tips that may be helpful.

RELATED GENES / SNPS

FTO, TCF7L2, MTNR1B , PPARG, BDNF, ABCB11

The six genes and their associated SNPs that are included in this category have all been shown in scientifically sound studies to have statistically significant associations with a person's ability to lose weight and keep it off. Several large studies have shown that people who participated in intensive and long-term diet and exercise programs exhibited significantly different weight loss responses based upon their genetic profile. Those people who carried the most 'unfavorable' pairs of genes, or genes, lost weight with the diet and exercise program—but, on average, they tended to lose less weight compared to other participants who had fewer, or who did not carry the 'unfavorable' genotypes. Also, after completing the diet and exercise program, people with more of the 'unfavorable' genes were, on average, also likely to regain some of the weight that they had lost. Keep in mind, however, that great individual variation is seen in research studies like these. The stated results are an average of all those within

WEIGHT LOSS ABILITY

a group, but there can still be differences even among those with the same genotype.

Our analysis investigated which genotype for each of these 6 genes was present in your DNA. Your rating of either NORMAL, BELOW AVERAGE or LOW reflects whether your genotypes included those that carried a risk of reduced weight loss ability.

TIPS FOR EFFECTIVE DIETING:

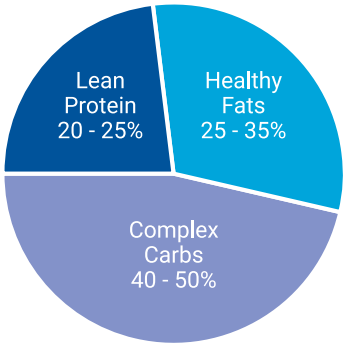
- Choose a plan that you will enjoy and that you will be able to stick to. It should include foods that taste good to you and an approach that fits with your lifestyle.
- Pay attention to influences that make it hard for you to choose the right foods or stick to a diet. For example, if you travel frequently and find it hard to eat well on the road, identify foods you can carry with you and the healthiest fast-food choices you might need to rely on.
- Identify reasons why you didn't stick to past diets. Develop back-up plans so that you aren't derailed from your diet if the same, or similar, circumstances arise again. For example, if you know that you will eat an entire bag of chips or package of cookies if you keep them at home, then take them off your shopping list. But give yourself a back-up snack that you can go to when you are having an I-Need-A-Cookie moment. It might be a nutritious nut energy bar, or simply some fresh blueberries.

TIPS TO GET THE GREATEST EXERCISE CALORIE BURN:

- If you are trying to burn more calories through exercise, favor the kind of exercise that burns the most calories in the amount of time that you spend exercising. This tends to be cardio workouts like walking, running, cycling, swimming, aerobics, dancing and any of the cardio machines. You can also get a sizable calorie burn from a fast-paced, boot camp-style or circuit training with weights workout. Slower-paced workouts like yoga and Pilates do not burn as many calories, so if you are doing these types of workout on most days of the week, focus on doing more cardio workouts instead.
- Exercise intensity is key for most people: the harder you work during both cardio and muscle conditioning exercise, the more calories you can burn, and the fitter your muscles and heart will become. But if you are a new exerciser, or if you are trying a new type of workout, you'll need to start easy and, over time, work up to workouts that last longer and feel harder. Start with 10-20 minute walking sessions if you need to, and over weeks add more time to the sessions and work at a harder intensity. When lifting weights, start with light weights and as movements feel easier, work you way up, over time, to using heavier weights.
- If you are a regular exerciser, you may need to push harder than you think. Many people believe that they are exercising intensely, when they are not.
- *For the most effective results, you'll need to burn enough calories to affect your body weight: aim to get in a minimum of 150 minutes and up to 300 minutes per week—or more—of moderate-to-vigorous cardio exercise* (e.g., jogging, walking, swimming, etc.). Ideally, you should incorporate some cardio every day, at least five days per week.
- Weight-training should be a part of your exercise plan. When you lift weights, you can make a diet more effective by preventing or minimizing the loss of muscle that occurs with dieting alone. Plus, certain types of high-intensity weight-lifting (doing circuits with cardio intervals, for example) may help rev your body up to burn a few extra calories in the hours after a workout.
- Reduce your sitting time! While standing more or moving around throughout the day is not considered 'exercise', the physical activity does add up and can help you burn more calories all day.

SUMMARY

What foods do you need to eat?



Your genotype suggests that you may have a better response to a weight-loss diet if daily calories come from the following proportions of fat, carbohydrates, and protein. You can monitor this with a diet log.

Based on your gender, age, height, current weight and current activity level, we recommend a diet of approximately 1,833 calories per day to lose weight. This number was calculated estimating your total energy expenditure, or the number of calories your body needs each day. Since you are interested in losing weight, you will need to eat fewer calories than your total energy expenditure. We suggest a modest calorie reduction of 20 percent. We have calculated this reduction into our calorie recommendation for you, so if you eat around 1,833 calories per day, you can expect to lose weight. This is not a drastic calorie reduction, so you should not feel hungry or like you are denying yourself food if you eat this many calories.

The amount of exercise you get can change your energy requirements. Therefore, you may need to eat more calories than this is if you are performing 45 minutes or more of moderate-to-high intensity cardio exercise on a daily basis.

Here are suggested macronutrient ranges to follow that may optimize the weight loss from your diet.

RECOMMENDATION	PERCENT	GRAMS	CALORIES
PROTEIN Choose a reduced-calorie diet that is between 20-25% protein. Get your protein from mostly plant food sources such as beans, legumes, nuts, seeds,whole grains and vegetables.	20% to 25%	92g to 115g	367 to 458
FAT Choose either a low- or moderate-fat, reduced-calorie diet. Get your fats mostly from plant foods, but avoid excess added oils.	25% to 35%	51g to 71g	458 to 642
CARBOHYDRATES You can lose weight on a reduced calorie diet that is either moderate or low in carbs. Choose complex carbs for more nutrients (veggies, beans, whole grains, etc.) and avoid simple or processed carbs (fries, chips, crackers, etc.).	40% to 50%	183g to 229g	733 to 917

The total number of calories or grams of each macronutrient shown represent a recommended amount to consume each day.

It's tough to keep track of this simply by reading food labels. That's because most foods contain a combination of the macronutrients. A food item usually contains either protein and fat (such as meat), carbohydrates and fat (such as oil-sauteed vegetables or French fries), or protein, carbohydrates and fat (beans, nuts and seeds, a chicken salad or a hamburger with a bun).

FOOD

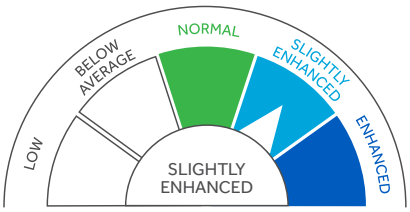
SUMMARY

It's not easy to know how much of any one macronutrient you are getting or if you are achieving your macronutrient goals simply by looking up the content of one food item. To determine your percentages of macronutrients, such as the fat or protein content of ALL the foods you eat in a day, you'll need to use a dietary app or online food log. You input what you eat and it will assess your overall macronutrient breakdown at the end of each day. We provide you with sample menus that can give you an idea of what a menu with your recommended macronutrient ranges will look like. But the only way to really know if you are reaching the suggested ranges for each macronutrient is to keep track by entering what you eat into a food log online or on an app.

PROTEIN UTILIZATION

WHAT YOUR GENES SAY ABOUT YOU:

Your genetic profile indicates that your response is **SLIGHTLY ENHANCED** utilization of protein. Your score reflects the fact that your genotype does include one of the allele combinations that lost slightly more weight when including a higher percentage of protein. Studies that investigated this genotype found that a diet consisting of 25% of protein resulted in optimal weight loss. However, people with this allele also lost more lean body mass compared to those without this genotype. This suggests that the amount of weight or body fat that you lose from a diet may be increased by eating a moderate, instead of a low, percentage of protein, but that you may lose more muscle mass along with it.



Your genetic profile indicate that your response is SLIGHTLY ENHANCED.

This indicates you may respond more favorably to a diet if you eat a moderate percentage of protein. Aim for 25% of the total calories in your diet to come from plant or animal-based protein

Since this genotype also suggests that you may lose more muscle mass when you are dieting compared to others with a different genotype, it is recommended to include resistance training in your exercise routine to prevent or minimize muscle loss that may come with weight loss.

SUCCESS STRATEGIES

Consuming a diet that is moderate-to-high in protein and including a balanced exercise routine that includes resistance training may help you to optimize your weight loss.

RELATED GENES / SNPS

FTO

The gene and associated SNP included in this category has consistently been shown to be associated with body fat mass and BMI. One large study found that people with the unfavorable genotype who dieted lost more weight, body fat and fat in the torso if they ate a moderate-to-high protein diet (25% of total daily calories) compared to a lower protein diet (15% of total daily calories), regardless of fat and carbohydrate distribution. However, they also lost more non-fat mass—which includes muscle—with the weight loss.

Our analysis of your genes investigated which genotype for this SNP was present in your DNA. Your rating of either NORMAL, SLIGHTLY ENHANCED or ENHANCED reflects whether your genotype included those alleles that exhibited protein sensitivity because their presence resulted in increased weight and fat loss on a moderate-to-high protein, reduced-calorie diet.

PROTEIN UTILIZATION

DIET

Protein in your foods should contain all of the essential amino acids, since your body requires these to produce proteins, as well as the other amino acids it uses to make compounds such as enzymes, hormones and tissues in your body. Animal foods contain all of the essential amino acids in one food item, such as meat, fish or dairy products. But if your genetic analysis for the other macronutrients suggests that you should reduce your intake of total fat or saturated fat, choose leaner versions of animal foods or, better, opt for plant-based protein foods.

You can obtain all of the essential amino acids in many single plant foods, including grains such as quinoa, seeds such as shelled hemp hearts (hemp seeds), and beans such as edamame or tofu. Or you can consume several complementary plant foods in the same day and obtain the essential amino acids your body needs (brown rice and black beans; nuts, grains and beans; veggies, beans and grains, etc.)

It's a good idea to get a sense of how much protein you are getting by recording your food intake for at least a week and entering it into a diet app or online nutrition log that can calculate the percentage of each of the macronutrients that you eat. Then you can tweak your menu as needed to obtain your recommended percentage of protein.

EXERCISE

Since this SNP is also associated with reduced lean body mass from dieting, which can include the loss of muscle tissue, it is recommended that you include exercise, especially heavier weight training, as part of your plan when you are losing weight. This may help minimize or prevent the loss of lean body mass that can occur with weight loss. Study your results for your genetic analysis for exercise-related genes for a more specific exe cise prescription. But for optimal muscle strengthening, you should do exercises with weights targeting your major muscle groups. On two to three, non-consecutive days per week, do three sets of 12 reps with weight heavy enough to feel "hard" or "very hard" by the end of each set.

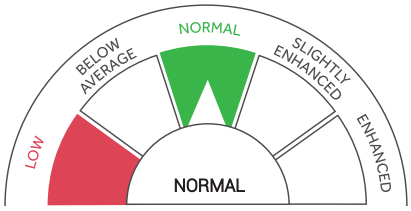
SUGGESTED PROTEINS

suggested servings contain listed grams of protein

Chicken Breast (3oz) - 25g
Ground Turkey (3oz) - 22.5g
Lean Beef (3oz) - 22g
Broiled Fish (3oz) - 20g
Lentils/Black Beans (1/2c) - 9g
Turkey (3oz) - 24g
Pork/Lean Ham (3oz) - 18g
Lamb (3oz) - 21g
Quinoa (1/2c) - 12g
Tofu (1/2c - 4.4oz) - 11g

FAT UTILIZATION

WHAT YOUR GENES SAY ABOUT YOU:



Our analysis indicates that your genetic profile exhibits a **NORMAL** utilization of fat. Your score reflects the fact that for the genes investigated, your genotype showed few, if any, of the unfavorable allele combinations. *This means that you appear to have a normal ability to lose weight from a diet and exercise program, whether the diet that is low, moderate or high in fat, as long as you are eating fewer calories than you expend each day. This result also suggests that you have a normal level of fat oxidation, or fat-burning ability in response to different levels of fat in your diet.*

Your genetic profile indicates that your utilization of fat is NORMAL.

If you are dieting, or reducing calories to create a negative energy balance, you can expect to lose similar amounts of weight on either a low or a moderate fat diet.

SUCCESS STRATEGIES

While you may experience similar results in terms of weight loss from following a reduced-calorie diet, no matter if it is low, moderate or high in fat, you may still be sensitive to other effects that higher intakes of fat may have on the body, especially from saturated fat from animal foods. It's tough to know how much fat you are consuming unless you are actively tracking what you eat and entering it into a diet app or online nutrition log. You might find it helpful to first determine how much fat you are currently eating so that you can identify ways to keep it at desired levels.

If you choose to eat higher-fat foods, be mindful of their high energy density. Since fat contains more calories per gram compared to the other macronutrients, foods and meals that are high in fat tend to have more calories. This makes it easier to overeat because you can easily consume more calories than you may realize.

RELATED GENES / SNPS

PPARG, TCF7L2, APOA5, CRY2, MTNR1B , PPM1K

The six genes and their associated SNPs that are included in this category all have been shown in scientifically sound studies to have statistically significant associations with how sensitive people are to eating a diet high in fat. In other words, these studies showed that the amount of fat in the diet affected how much weight individuals lost from a lifestyle intervention depending on the genotype at these genes. One study found that those people with an unfavorable genotype were more likely to have more body fat, a larger waist size and a higher BMI the more fat they ate, compared to others without the same genotypes. Another study found that people with a protective genotype appeared to be able to consume greater amounts of fat, but without exhibiting higher BMIs. Another study found that people who went on a low-calorie diet that was higher in fat lost less weight if

FOOD

FAT UTILIZATION

they had an unfavorable genotype.

Our analysis of your genes investigated which genotype for each of these 6 genes was present in your DNA. Your rating of either NORMAL or LOW reflects whether your genotypes included those that carried a risk of reduced weight loss ability from a diet that was high in fat.

While your genetic profile suggests that you may be better able at handling higher levels of fat when you diet, if you are trying to lose weight, you will still need to reduce the number of calories that you eat. You may still need to reduce how much of these foods that you eat. You may be better able to handle a high-fat French fry or food that contains high-fat cheese, but if you are trying to lose weight, limit yourself to a few fries and only a small portion of the food.

SUGGESTED FATS

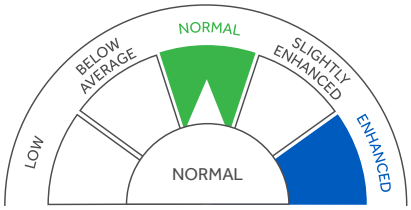
suggested servings contain listed grams of fat

Avocado (1/2 fruit) - 10g
Coconut Oil (1T) - 14g
Olive Oil (1T) - 14g
Nut Butters (1T) - 8g
Coconut (1 piece, 2" x 2" x 1/2") - 15g
Olives (1T) - .9g
Nuts/Seeds (1/4c) - 13g
Butter (1T) - 12g Oils (1T) - 14g

CARB UTILIZATION

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits a **NORMAL** utilization of complex carbohydrates. Your score reflects the fact that your genotype does not appear to produce greater weight loss with a higher complex carbohydrate diet, and *you can expect to lose around the same amount of weight with either a low, moderate or higher complex carb diet.* Complex carbs provide the most nutrients and fiber and, if you exercise, can provide you with longer-lasting energy.



Your genetic profile indicates that your utilization of complex carbohydrates is NORMAL.

This suggests that the percentage of complex carbohydrates in a reduced-calorie diet may not affect your weight loss results – you can expect to lose a similar amount of weight with either a low, moderate or high complex carbohydrate diet. Complex carbs provide the most nutrients and fiber and, if you exercise, can provide you with longer lasting energy.

SUCCESS STRATEGIES

To lose weight, your genotype suggests that you can lose weight with any reduced calorie diet, regardless of proportions of the macronutrients (fat, protein and carbs) as long as you reduce overall calories to less than you burn each day.

Study your results from the other Macronutrient genetic analyses for more guidance on the best type of diet to choose. Also, if you have certain health conditions, it may be optimal to adapt your eating choices based on established dietary recommendations for specific issues. For example, if you have health conditions like poor cholesterol or hypertension, a lower carb and higher fat diet may not be beneficial. You may experience more health benefits from a plant-based diet that is very low in fat from foods

RELATED GENES / SNPS

IRS1

The gene and associated SNP included in this category has been shown to be associated with a person's insulin sensitivity and the effects of carbohydrates in the diet. Insulin is a hormone produced by the body that helps cells take in glucose, or sugar, that is present in the blood after the digestion of carbohydrates in foods. All cells use glucose for fuel, and brain cells and red blood cells use glucose as a primary source of energy. If cells have trouble absorbing blood sugar, the body releases greater amounts of insulin to help. Increased amounts of insulin can lead to insulin resistance. People who are overweight and/or physically inactive are at higher risk of insulin resistance and the condition can lead to diabetes, or uncontrolled high blood sugar. Greater amounts of insulin released can also encourage fat storage.

Since carbohydrate intake triggers insulin release, many people assume that eating more carbs is not healthy and can lead

CARB UTILIZATION

(such as meat, cheese and even avocado) or added fats (like oils and butter).

But remember, to achieve success with any approach, and to keep the weight you lose off for the long term, you must choose a plan that is easy to stick to. It's the long term adherence that will make a difference in how lean you are over time. Choose the type of plan that will help you maintain the healthier lifestyle changes that you make.

SUGGESTED CARBOHYDRATES

Preferred Vegetables - 1 1/2 cups raw or cooked contains 15g of carbohydrates

Artichoke
Asparagus
Bean sprouts
Beans (green, wax, Italian)
Beets
Broccoli
Brussels sprouts
Cabbage
Carrots
Cauliflower
Celery
Cucumber
Eggplant
Green onions or scallions
Greens (collard, kale, mustard, turnip)
Kohlrabi
Leeks
Mixed vegetables (no corn or peas)
Mushrooms
Okra
Onions
Pea pods
Peppers
Radishes
Salad greens
Sauerkraut
Spinach
Summer squash
Tomato (canned, sauce, juice)
Turnips
Water chestnuts
Watercress
Zucchini

to body fat and weight gain, as well as diabetes. But the relationship is not that simple: many people who eat a high carbohydrate diet are not overweight and do not have diabetes. The type of carbs consumed as well as other foods in the diet and physical activity levels can all play a role. The gene in this category seems to influence insulin resistance and the body's response to carbs in the diet. One long term study found that people with a variant of this gene who ate a high carbohydrate, low fat diet, that consisted of high fiber, whole plant foods, as opposed to processed, lower fiber carbs, had greater insulin sensitivity—and lower levels of insulin and insulin resistance—and experienced greater weight loss compared to a lower carb, higher fat diet.

Our analysis of your genes investigated which genotype for this gene was present in your DNA. Your rating of either NORMAL or ENHANCED reflects whether your genotype included those genes that increase risk of reduced weight loss ability from a low carb, higher fat diet.

FOOD

CARB UTILIZATION

Preferred Legumes (Beans) - 1/2 cup contains 15g of carbohydrates

Garbanzo/Chickpeas
Pinto beans
Northern beans
Fava/Broad beans
Kidney beans
White beans
Black beans
Split peas
Black-eyed peas
Lentils
Edamame beans
Navy beans
Mung

Preferred Starchy Vegetables - suggested serving size contains 15g of carbohydrates

Peas, green (1/2 c)
Red/New Potato, baked or boiled, 1 small (3 oz)
Yam, sweet potato, plain (1/2 c)
Squash, winter - acorn, butternut (1 c)

Preferred Fruits - suggested serving size contains 15g of carbohydrates

Apple, unpeeled, 1 small (4 oz)
Apricots, fresh, 4 whole (5 1/2 oz)
Banana, small 1 (4 oz) Blackberries
(3/4 c)
Blueberries (3/4 c)
Cantaloupe, small (1/3 melon or 1 c cubes)
Cherries, sweet, 12 fresh (3 oz)
Grapefruit, 1/2 large (11 oz)
Grapes, 17 small (3 oz)
Honeydew, 1 slice (10 oz or 1 c cubes)
Kiwi, one (3 1/2 oz)
Mango, small, 1/2 fruit (5 1/2 oz or 1/2 c)
Nectarine, 1 small (5 oz.)
Orange, 1 small (6 1/2 oz)
Papaya, 1/2 fruit (8 oz or 1 c cubes)
Peach, fresh, 1 medium (6 oz)
Pear, fresh, 1/2 large (4 oz)
Pineapple, fresh 3/4 c
Plums, 2 small (5 oz)
Raisins (2 T)
Raspberries (1 c)
Strawberries, whole berries (1 1/4 c)
Tangerines, 2 small (8 oz)
Watermelon, 1 slice (13 1/2 oz or 1 1/4 c cubes)

Preferred Grains - 1/2 cup contains listed grams of carbohydrates

Couscous - 15g
Kamut - 26g
Quinoa - 28g
Barley - 22g
Oats - 15g
Amaranth - 23g

PROCESSED/LESS DESIRABLE CARBOHYDRATES

Less Desirable Starchy Vegetables

Mixed vegetables with corn or peas
Corn on the cob
Corn

Less Desirable Grains

Bread
Bagel
Pancake/Waffle
Cereal
Crackers
Rice
Pasta

SUMMARY

What nutrients do you need?

NUTRIENTS	TENDENCY	GOOD SOURCES INCLUDE
Folate	BELOW AVERAGE	Pinto Beans, Asparagus, Broccoli
Vitamin A	BELOW AVERAGE	Carrots, Kale, Tuna
Vitamin B6	LOW	Pistachios, Watermelon, Potatoes
Vitamin B12	NORMAL	Lean meat, Seafood, Fortified Dairy Product
Vitamin C	NORMAL	Red Bell Peppers, Strawberries, and Oranges
Vitamin D	NORMAL	Salmon, Egg Yolks, Fortified Dairy Milk

HOW DO MICRONUTRIENTS AFFECT MY BODY WEIGHT?

Micronutrients have not been shown to have a direct effect on body weight or body fat. So why are they included in this genetic analysis?

The vitamins tested play important roles in a variety of functions in the body that may affect your body weight—or your ability to manage it.

Many micronutrients are involved in the body's metabolism of fat, carbohydrates and protein. When you are eating and exercising, you want your metabolism to function smoothly. The body does find ways to cope when some nutrients are not available. But for optimum performance and energy, you'll do best when your body has all it needs to work properly.

Some nutrients such as vitamin C and vitamin D may not affect body weight directly, but they play a role in bone health, inflammation and healing. The stresses you put your body under when exercising may be bolstered if you are well nourished in these nutrients.

DO MY RESULTS SHOW THAT I AM LOW IN NUTRIENTS?

If you scored LOW or BELOW AVERAGE, you're genotype results show that you may have a higher risk for having blood levels of certain nutrients that may be in the lower end of the normal range. For a few nutrients, such as vitamin B12, it may be optimal to be in the mid range of normal, or higher. This genotype risk assessment is based on studies where study participants with certain genotypes for the various nutrients tested were shown to be more likely to be in the lower end of the normal range for a nutrient.

Be careful of assuming these results indicate you are low, or deficient in a certain nutrient. The only way to know for sure if you are in the low end of the normal range for a nutrient, or if you are actually deficient, is to consult with your physician and get a specific blood test designed to assess a specific nutrient. This genetic test can only assess your risk; the blood test is what can assess your actual levels.

SUMMARY

WHICH FOOD CHOICES FOR CERTAIN MACRONUTRIENTS ARE THE BEST FOR ME?

Our genetic testing analyzes your genotype and assesses your potential levels of macronutrients. This testing does not test your individual sensitivity or response to certain foods that may contain these macronutrients. You may have other individualized responses that are not detected in the genetic tests. For example, you may be allergic to the proteins in dairy foods. Or you may have a negative response to the lactose sugars in dairy products. This report cannot inform you about these reactions. Any food recommendations that are suggested to help you obtain certain nutrients should be modified based on other factors that you may already know about.

HOW CAN I MONITOR MY NUTRIENT INTAKE?

Your body absorbs a certain amount of nutrient as food or supplements are digested. Then your body uses or stores the nutrient as needed. There are many factors that affect how much of a nutrient you take in, how much of a nutrient is absorbed and used by your body, and whether your body stores are in the normal range.

Your genotype for certain nutrients can indicate that you may be at risk for having lower levels of certain nutrients. But since the genotype analysis is not measuring what you eat, the supplements you take, or actually measuring levels in your blood or tissues, the genotype analysis alone cannot relate your true status.

People who are low or deficient in a nutrient may absorb more from food than someone who is not deficient. A person who needs more of a certain nutrient may absorb more of it from a food than someone who has normal levels. There are also other factors that can affect absorption positively or negatively, and that can affect how your body uses what you take in.

How do you know what your true nutritional status is? A blood test is generally the only way to truly test your true nutritional status. What is in the blood when tested may not always reflect what is in the tissues or how much is being used by the body. But at present, this is the measure used for most nutrients. There may also be different blood tests that monitor the same nutrient.

Keep these factors in mind as you interpret your genotype results and the suggestions given. No one result is going to give you all the information you need. But taken together, the results of your genotype analysis, along with a blood test can help you spot potential areas where you can optimize your nutrition.

SHOULD YOU TAKE A SUPPLEMENT?

Most nutritionists recommend that nutrients be obtained first through food. Research studies have tended to show more favorable outcomes when research participants obtained nutrients from food sources rather than from supplements. Nutritional experts vary in their opinions about whether people should take supplements or not.

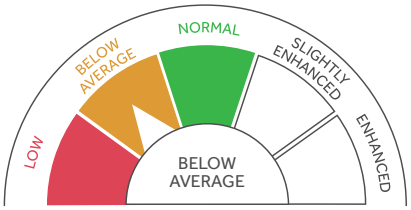
Most supplements are considered safe. But be cautious with dosing because research on appropriate levels has identified ranges for some nutrients beyond which toxic effects can occur. These ranges are known as the Upper Intake Level, or UL. It is difficult to reach the UL by getting the nutrients from food, but it is easy to reach these high risk levels from supplementation.

If you do choose to supplement, keep track of the nutrients you get from all foods. Read food labels since some foods that you eat may also be fortified in the supplements you are taking. Use dietary software to input what you eat and supplement with so you can keep an estimate of your total nutrient intake and will be less likely to overdose. Also consult with your doctor if needed. Some supplements, including vitamin A and vitamin B6, can interact with medications you may be taking.

VITAMIN B9 – FOLATE TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile is **BELOW AVERAGE**. Your score reflects the fact that your genotype showed a higher risk allele combination. This means you have a chance of having slightly reduced blood levels of folate. This suggests that you may be at risk for higher levels of homocysteine, which is a risk factor for heart disease, and your Vitamin B12 blood levels may be low.



Your genetic profile indicates that your response is BELOW AVERAGE.

This suggests that you may have a chance of having slightly-reduced levels of folate. You may want to ask your doctor to take a blood test to assess your levels of serum folate, Vitamin B12 and homocysteine. If your levels are low, getting enough by eating plant foods every day and supplementing with folate may be beneficial.

SUCCESS STRATEGIES

- Since you may be at risk of having lower levels of folate, you may want to discuss with your physician whether you should get a blood test to check for folate-related conditions including anemia, as well Vitamin B12 and homocysteine status. Your genes only predict your risk, but a blood test can give you concrete information about your body levels of this nutrient.

- All women should ensure they get enough folate in their diet. Because you are at a risk of having lower levels, you may want to eat even greater amounts of folate. You will get folate that is added to whole grains in cereals and breads, but you should also eat natural food sources of folate. The foods highest in folate include legumes, fruits and vegetables, especially greens.

RELATED GENES / SNPS

MTHFR

This gene and its associated SNPs have been shown to have significant associations with a person's folate, or vitamin B9, status. Folate plays many important roles in the body, including acting as a coenzyme in DNA creation and in energy metabolism reactions. Folate also plays a role in biochemical processes that affect the metabolism of an amino acid, homocysteine. One SNP associated with this gene is associated with enzyme activity that can lead to higher levels of homocysteine. Since homocysteine is a risk factor for heart disease, high levels may be of concern. In child-bearing women, getting sufficient amounts of folate is important because low levels can lead to neural tube birth defects. As a public health measure, grains are fortified with folate to ensure that women of childbearing age get enough. Low levels of folate can also lead to anemia.

In studies on this gene, people who carried the most unfavorable pairs of genes, or

NUTRIENTS

VITAMIN B9 – FOLATE TENDENCY

alleles, had only a 10%-20% efficiency at processing folate. And those with the below average allele had a 60% efficiency at processing folate. People with more of the unfavorable alleles are more likely to have high homocysteine and low Vitamin B12 levels. Poor ability to process folate may be fairly common: Around 53% of women appear to have these unfavorable genotypes.

- Some of the folate in food is diminished with heat from cooking or oxidation during storage. To minimize potential losses, eat plant foods at every meal to make sure you get enough, eat fresh produce quickly after purchase, and incorporate some raw plant foods into your meals.

- You can also supplement your diet with folate. However, since low levels of Vitamin B12 can mask anemia if folate is taken, it is a good idea to supplement with both Vitamin B12 and folate.

- Smoking can also decrease folate levels. You may need to consume more if you smoke — or better yet, quit smoking!

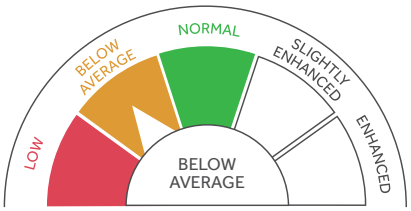
FOLATE-RICH FOODS TO INCLUDE IN YOUR DIET:

Lentils, pinto beans, asparagus and broccoli are excellent sources of folate.

VITAMIN A TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits a **BELOW AVERAGE** ability to process Vitamin A from a beta-carotene supplement compared to others with a different genotype. Your score reflects the fact that, for the gene investigated, your genotype showed some of the allele combinations that resulted in less beta-carotene in supplement form being converted into Vitamin A as reflected in a blood test. This means that if you take high doses of a beta-carotene supplement, your ability to convert the nutrient into an active form of Vitamin A may be reduced compared to someone with a different genotype.



Your genetic profile indicates that your response is BELOW AVERAGE.

This suggests that your ability to convert high doses of beta-carotene from a supplement into an active form of Vitamin A may be reduced. You may want to get a blood test to assess your blood levels of Vitamin A, and, if your levels are low, then consume more beta-carotene and Vitamin A-rich foods, or possibly take low-dose supplements if you are deficient.

SUCCESS STRATEGIES

- You may want to request a blood test assessing your levels of Vitamin A from your doctor.
- Vitamin A is needed for good vision. Needs may increase in women who are pregnant or lactating. If your levels are low or your body is deficient, vision and other aspects of health can be affected. You may want to increase your intake of beta-carotene and Vitamin A-rich foods, and perhaps take Vitamin A supplements.
- If you do take a supplement, make sure not to exceed recommended levels of supplemental beta-carotene or Vitamin A, as toxicity can occur.

RELATED GENES / SNPS

BCMO1

The gene and its associated SNPs that are included in this category have been shown to have statistically significant associations with a person's blood levels of Vitamin A. Vitamin A promotes good vision, is involved in protein synthesis that affects skin and membrane tissues, and helps support reproduction and growth. The nutrient is found in plant foods in its precursor forms such as beta-carotene. Beta-carotene is converted by the body into different active forms of Vitamin A: retinol, retinal and retinoic acid. Animal foods, such as meat and dairy, provide the retinol form of Vitamin A.

It is rare to overconsume beta-carotene in plant foods to reach toxic levels. However, it is possible to consume toxic levels of Vitamin A from organ meats or fortified foods. Pregnant women are advised to eat liver no more than once every two weeks.

NUTRIENTS

VITAMIN A TENDENCY

- Be aware that some medications, alcohol or health conditions may interact with Vitamin A supplements and cause adverse effects. Discuss supplementation with your doctor.

Vitamin A in the form of beta-carotene is found in foods such as vegetables, especially leafy greens like spinach and orange foods such as carrots, sweet potatoes, apricots, mango and cantaloupe, as well as in the retinol form in dairy and in organ meats like liver.

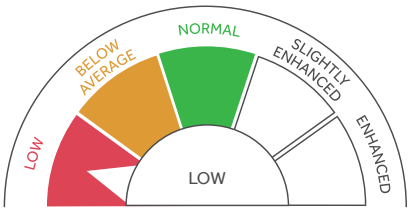
VITAMIN A-RICH FOODS TO INCLUDE IN YOUR DIET:

Broccoli, Swiss chard, collard greens, kale, carrots, butternut squash, apricots, goat's cheese, liver, tuna.

VITAMIN B6 TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic response is **LOW**. Your score re lects the fact that your genotype showed the most unfavorable allele combination. This means there is a risk that your blood levels of B6 may be lower than normal. Keep in mind that increased risk does not mean that your blood levels are low. You can only know this by requesting a blood test from your physician or other healthcare provider.



Your genetic profile indicates that your response is LOW.

indicating that you are at risk for having low levels of Vitamin B6. Check your status by asking your doctor for a blood test. Eat enough B6-rich foods and supplement if you are low.

SUCCESS STRATEGIES

Since you are at risk for having lower levels of Vitamin B6 in your blood, it is especially important that you get adequate amounts of this nutrient in your diet. Monitor your intake by keeping a food log and using a dietary app to obtain a nutrient analysis to see how much Vitamin B6 you consume. It's a good idea to keep a food log periodically, especially if you go through periods in life where you are aware that you may not be eating properly.

If your blood tests show low levels, you may wish to take a Vitamin B6 supplement. Be sure to avoid high doses, as they can cause nerve damage.

RELATED GENES / SNPS

NBPF3

The gene and its associated SNPs included in this category have been shown to have statistically significant associations with a person's blood levels of Vitamin B6. In one large study, people who carried the most unfavorable pairs of genes, or alleles had lower levels of Vitamin B6.

Vitamin B6 is important for nerve cell function, energy metabolism and the production of hormones, such as serotonin and epinephrine. Low levels of B6 are also linked to higher levels of homocysteine, which increases heart disease risk. B6 is found in many foods including grains, legumes, vegetables, milk, eggs, fish, lean meat and flour products.

VITAMIN B6 TENDENCY

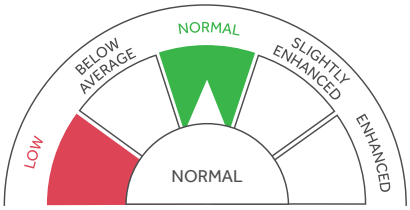
VITAMIN B6-RICH FOODS TO INCLUDE IN YOUR DIET:

Pistachios, pinto beans, wheat germ, bananas, watermelon, carrots, spinach, peas, squash, potatoes, avocados, yellowfin tuna, sunflower seeds.

VITAMIN B12 TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile is **NORMAL**. Your score reflects the fact that your genotype showed few, if any, of the unfavorable allele combinations. This suggests that, as long as you consume a healthy diet that includes Vitamin B12, you are likely to have normal blood levels of vitamin B12. Keep in mind, however, that vitamin B12 deficiencies can develop with some health conditions. Also, aging can result in poorer absorption of vitamin B12 from foods.



Your genetic profile indicates that your response is NORMAL.

This suggests that your blood levels of Vitamin B12 are likely to be normal.

If you follow a plant-based vegan diet that does not include fortified foods, levels also can become low.

SUCCESS STRATEGIES

Getting a nutrient analysis of what you eat can give you an indication of how much of a nutrient you are consuming. Do periodic checks of your estimated vitamin B12 intake with a food log using a dietary app.

To assess how well nutrients in your foods are absorbed, it is a good idea to get periodic testing of your blood levels of vitamin B12. If absorption is impaired, your blood levels may be low and you may wish to supplement with B12.

VITAMIN B12-RICH FOODS TO INCLUDE IN YOUR DIET:

Lean meat, seafood, dairy products, eggs, fortified breakfast cereals, certain brands of fortified nutritional yeast.

RELATED GENES / SNPS

FUT2

The gene and associated SNPs included in this category have been shown to have significant associations with a person's blood levels of Vitamin B12. In one large study, those women who carried the most unfavorable pairs of genes, or alleles, had slightly lower levels of Vitamin B12, although they were in the acceptable, but low, end of the range. Around 70% of people have genotypes that suggest they may be at risk for having blood levels of B12 that are at the lower end of the normal range. There are several reasons why blood levels of B12 can be low. Some people do not get enough in their diet and so they are simply not getting enough of the nutrient. Some other people get enough, but do not absorb it efficiently. A small percentage of people over 50 or those who have had gastrointestinal surgery or GI disorders such as Crohn's disease may also have reduced abilities to absorb it.

Vitamin B12 is important for many processes in the body, including red blood

VITAMIN B12 TENDENCY

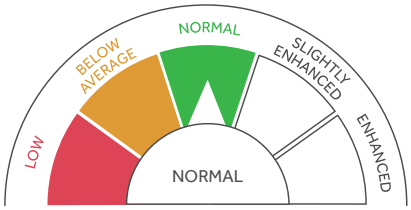
cell formation, neurological function and cognitive performance. Deficiencies of B12 can cause pernicious anemia, and is also associated with high levels of homocysteine, which may impair arteries and increase risk of heart disease. There is some evidence that subclinical symptoms may be associated with being in the low end of the normal range.

Vitamin B12 is produced by microorganisms found in soil and water, and in both the guts of animals and humans. In the modern world, highly-sanitized food processing systems have eliminated many naturally-occurring sources of B12-providing bacteria in plant products. So B12 is typically obtained from animal foods such as meat, or fortified foods such as dairy and plant milks or breakfast cereals. Certain mushrooms and seaweed may provide some B12, but are not considered to be reliable sources.

VITAMIN C TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile suggests that you are likely to have **NORMAL** levels of Vitamin C. Your score reflects the fact that for the gene investigated, your genotype did not show the unfavorable allele combinations. This means that if you consume enough Vitamin C in the foods you eat, blood levels of L-ascorbic acid should be in the normal range. If you smoke, however, you may deplete some of your Vitamin C and may need more.



Your genetic profile indicates that your response is NORMAL.

If you eat enough Vitamin C-rich foods, you should have normal levels in your blood.

SUCCESS STRATEGIES

- To ensure your body gets the Vitamin C it needs, make sure to include a wide variety of plant foods, including citrus in your diet.
- If you wish to supplement with Vitamin C, avoid very high doses because they can cause diarrhea and gastro-intestinal distress.

VITAMIN C-RICH FOODS TO INCLUDE IN YOUR DIET:

Broccoli, red bell peppers, kiwi fruit, Brussels sprouts, strawberries, oranges, watermelon, pinto beans.

RELATED GENES / SNPS

SLC23A1

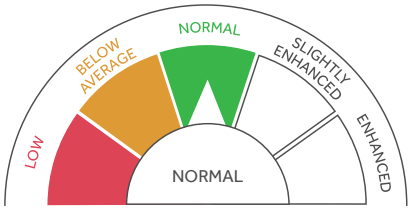
The gene and associated SNP included in this category has been shown to have statistically significant associations with a person's blood levels of L-ascorbic acid, or Vitamin C. Those people who carried more unfavorable pairs of genes, or alleles, were more likely to have lower blood levels of the nutrient.

Vitamin C is a nutrient that has many functions in the body, including acting as an antioxidant, and is needed for skin and membrane tissues. Low levels have also been associated with diseases such as heart disease and cancer. Vitamin C also helps with the absorption of iron. The nutrient must be obtained from foods since the human body cannot make its own, as some other animals can. Vitamin C can be found in citrus fruits, but is also in many fruits, vegetables and legumes.

VITAMIN D TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic response is **NORMAL**. Your score reflects the fact that for the genes investigated, your genotype showed few, if any, of the unfavorable allele combinations. This means that, assuming you get adequate sun exposure or Vitamin D from dietary sources, your risk of being deficient in Vitamin D is low.



Your genetic profile indicates that your response is NORMAL.

Make sure to get enough sunlight each week to keep Vitamin D levels in the acceptable range.

SUCCESS STRATEGIES

- Expose yourself to the sun on most days of the week for at least 10 to 15 minutes (30 to 50 minutes if you have naturally dark skin). Spend more time outdoors in winter months, or if you live in northern latitudes.

- Get a blood test from your doctor to determine your nutrient levels. If you are deficient in Vitamin D, do a nutrient analysis to determine how much Vitamin D you consume, then eat more foods containing Vitamin D or take supplements.

RELATED GENES / SNPS

GC, NADSYN1, CYP2R1

The genes and their associated SNPs that are included in this category have been shown to have statistically significant associations with a person's blood levels of Vitamin D (which is actually a hormone). One study found that several SNPs linked to low levels of Vitamin D were from genes that may play a role in the Vitamin D conversion and delivery process. Those people who carried unfavorable pairs of genes, or alleles, had a higher risk of low levels of Vitamin D, and those who carried several unfavorable SNPs had a much higher chance of being deficient in Vitamin D.

Vitamin D has been proven in research to be crucial for bone health. Low levels of Vitamin D have been associated with a variety of health conditions, including heart disease, diabetes, depression and cancer.

A blood test from your doctor can determine your blood levels of Vitamin D. Vitamin D is primarily produced by the

NUTRIENTS

VITAMIN D TENDENCY

VITAMIN D-RICH FOODS TO INCLUDE IN YOUR DIET:

Salmon, mackerel, sardines, egg yolks, fortified almond, soy or other plant milk, fortified dairy milk.

body from exposure to ultraviolet rays from sunlight, and this is considered to be the optimal source since Vitamin D generated by the body lasts longer in the body than Vitamin D taken in supplement form. Your levels are likely to be higher if you live in the southern latitudes and during the summer. However, it is not uncommon for people with lots of exposure to the sun to still have low levels of Vitamin D. In general, only 10 to 15 minutes of sun exposure to bare skin per day during the summer months is needed for a Caucasian to produce the Vitamin D he or she needs. Darker skinned people will need to spend 2-5 times more time in the sun. Since Vitamin D is stored in the body, stores can be built up during warmer months and may compensate for less sun exposure during winter months.

Vitamin D can be obtained through foods such as oily fish and egg yolks, as well as fortified dairy and plant milks, and fortified cereals. Vitamin D can also be taken in supplements. If you test low and choose to take a Vitamin D supplement, be careful of taking higher doses because there can be adverse effects.

SUMMARY

How much should I exercise?

Your body weight and body fat levels are the direct result of how much you eat as well as how much and how you move. Certain genes can play a role in your response to what you eat and how you exercise.

Traditionally, most people focus on dieting to lose weight, but exercise is a key part of losing weight effectively and it's been proven in research to be crucial for keeping the weight you lose off.

There are two major things you should know about exercising to lose weight:

1. Any regular exercise can enhance weight loss from dieting. If you have a certain genotype, you may experience a greater or lesser response compared to others, but your response still depends on the type and amount of exercise that you do. For weight loss and fat loss, the more calories you burn through exercise, the better your results will be.

   Achieve a greater calorie burn by focusing on cardio exercise such as walking, running, cycling or cardio machines. When you move, you can increase your calorie burn in one of two ways. You can exercise harder at a higher intensity, or you can keep your intensity easier and exercise at a moderate pace, but for longer sessions. We'll explain how to monitor and manipulate your intensity in greater detail later in your report.

2. Muscle matters, too. It keeps you strong, it helps your body stay firm and shapely. You may have a certain genotype that makes you more or less muscular, or that makes you more or less strong, but your muscle response to both dieting and exercise will still be affected by the type and amount of exercise that you do.

   When you are dieting, it is very important to include exercise that helps to strengthen muscle. When a person loses weight by only dieting and not exercising, they are likely to lose more muscle mass along with the pounds of fat that are lost. If you exercise, especially if you do resistance training (lift weights), you can prevent or minimize the loss of muscle mass that can occur with weight loss.

EXERCISE

SUMMARY

CARDIO EXERCISE

FREQUENCY (days per week)

1 2 3 4 5 6 7

INTENSITY

LOW MODERATE HIGH

DURATION (minutes per week)

100 150 200 250 300 350 400

Perform moderate to vigorous intensity cardiovascular exercise 4 to 5 days a week for a minimum of 200-300 minutes per week. You can achieve greater results by lengthening the duration of moderate intensity cardio, focusing on endurance activities like biking or running.

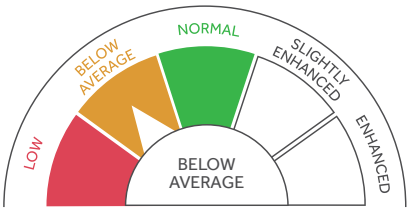
STRENGTH TRAINING

Lift weights 3 days per week using weights that are heavy enough to challenge you at the end of each of 3 sets of 12 reps. Include at least one day of power training, doing 1 to 3 sets of 5 to 8 reps with significantly heavier weight. If by the end of each set of repetitions, you feel like you could keep performing the exercise, the weight you are using is too light to provide a sufficient muscle-strengthening stimulus. As you near the end of the exercise, you should feel like the last 2 to 3 reps are difficult to complete while maintaining good form.

FAT LOSS RESPONSE TO CARDIO

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits a **BELOW AVERAGE** fat loss response to cardio. Your score reflects the fact that among the genes investigated, you had a few of the 'unfavorable' gene combinations. This means that, based on your genes, you have a greater chance of showing a slightly diminished fat loss response to doing a minimal cardio routine on three days per week, compared to others with a more favorable genotype. This does not mean that you will not or cannot lose fat, however. This result only suggests that you may have a slightly more difficult time losing as much as someone else with a more favorable genotype. Of course, not everyone loses the same amount of body fat when they embark upon an exercise program. Genetic predisposition plays a role, but other factors also affect how much fat you lose.



Your genetic profile indicates that your fat loss response to cardio is BELOW AVERAGE.

You should experience fat loss when performing cardio for 90 to 150 minutes 3 days per week, but you may experience greater benefits by doing more: make each session longer, exercise at a higher intensity and aim for at least 5 days a week.

SUCCESS STRATEGIES

Your genetic profile predicts that you may not lose as much fat as someone with a more favorable genotype from doing cardio exercise three days per week while working out at a moderate-to-high intensity. However, official exercise recommendations suggest that this is not enough exercise for most people who wish to manage their body weight.

- For you, three days of exercise per week may not be enough to experience optimal fat and weight loss results. You may get results from more exercise because you will burn more calories. Aim to get at least four to five days per week of cardio exercise for a total of 200 to 300 minutes per week.

RELATED GENES / SNPS

ADRB2, LPL

The genes and their associated SNPs that are included in this category have been shown in a study to have significant associations with a person's ability to lose fat from a regular program of cardio exercise.

A large study investigating these genes put sedentary men and women on a 20-week endurance exercise program. They exercised on a bike 3 times per week, starting at a moderate intensity for 30 minutes per session over the first few weeks. They built up to a longer, slightly harder workout that lasted 50 minutes for the last 6 weeks. Men in the study did not appear to have a different response based on their genotype. However, women who carried the most 'unfavorable' genotypes

EXERCISE

FAT LOSS RESPONSE TO CARDIO

- Include muscle-strengthening exercises two to three days per week.
- You may benefit from the increased calorie burn of resistance interval training, where you alternate high-intensity resistance training exercises followed by low-to-moderate cardio intervals. Warmup with light cardio movement such as marching in place for 10 minutes, then do a one minute burst of fast resistance activity—squats while holding moderately heavy weights, for example. Then follow that burst with another three to five minutes of easy cardio movements such as stepping up and down off a step, and repeat the sequence.

lost fat from the exercise program—but they tended to lose less fat compared to other participants who did not carry the 'unfavorable' genotypes.

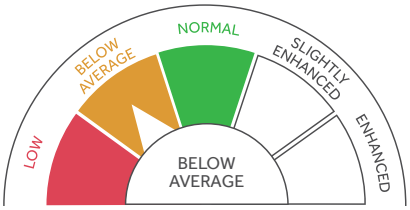
No matter the genotype, even though some fat loss was seen with the 3 days per week, 90-to-150-minutes-per-week regimen in this study, for dramatic decreases in body fat that also result in weight loss, most people will get better results if they do more exercise per week.

Our analysis investigated which genotype for each of these genes was present in your DNA. Your rating of either NORMAL, BELOW AVERAGE or LOW reflects whether your genotypes included those that carried a risk of reduced fat loss response from a regular program of cardio exercise.

FITNESS RESPONSE TO CARDIO

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits a **BELOW AVERAGE** fitness response to high-intensity exercise. Your score reflects the fact that your genotype showed the 'unfavorable' gene combinations. This means you have the potential to not see the same improvements in fitness from high-intensity cardio workouts as someone else with a more favorable genotype would. The good news is that you might be able to attain the same cardiovascular benefits by working at lower intensities.



Your genetic profile indicates that your fitness response to moderate-to-high-intensity cardio is BELOW AVERAGE.

You may be less likely to experience optimal cardiovascular fitness improvements from high-intensity cardio compared to others with a more favorable genotype. This does not mean that you will not improve your fitness. You can. But you will likely see greater gains from longer, moderate-intensity workouts. Or you may benefit from endurance-based resistance workouts such as circuit training and power training.

SUCCESS STRATEGIES

Your genotype suggests you might benefit most from sticking to moderate intensity workouts. Therefore, you might see better fitness results from longer endurance workouts.

Aim for more moderate-intensity cardio workouts on four or more days per week that last longer over time. Start with 20 to 30 minute sessions and work up to 60 to 90 minutes. You may want to consider training for an endurance event like a charity bike race or a 10K, half-marathon, or even a full marathon.

RELATED GENES / SNPS

AMPD1, APOE

The genes and associated SNPs included in this category have been shown to have significant associations with a person's response to moderate-to-high intensity exercise.

Many factors play roles in being able to push hard without feeling overly fatigued when exercising. One reflection of fitness is oxygen capacity, also known as VO2 Max. As a person becomes fitter, their ability to take in more oxygen improves, which helps them to work out harder and longer. The greater one's VO2 Max, the more exercise they can handle since they can take in more oxygen that working muscles need during intense physical activity.

Several large studies investigating these genes had sedentary men and women do cardio exercise 3 to 4 days per week for 5 to 6 months. They used a variety of cardio machines (bike, treadmill, rowing machine, step-climber, etc.) for up to 50 minutes.

EXERCISE

FITNESS RESPONSE TO CARDIO

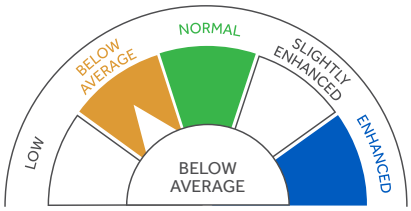
Those people with the 'unfavorable' genotype experienced smaller gains in their cardiovascular fitness from the training. They seemed to show a decreased ability to perform at higher effort levels, suggesting their optimal fitness response may be better achieved at a lower intensity of exercise.

Our analysis investigated which genotype for these genes was present in your DNA. Your rating of either NORMAL, BELOW AVERAGE OR LOW reflects whether your genotypes included those that carried a risk of reduced cardiovascular fitness response from moderate-to-higher-intensity exercise.

BODY COMPOSITION RESPONSE TO STRENGTH TRAINING

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits a **BELOW AVERAGE** body composition response to muscle-strengthening exercise compared to others with a more favorable genotype. This means that you are likely to experience a reduced ability to lose weight and to decrease your body fat from weight training alone.



Resistance training does not typically burn enough calories to cause clinically significant weight loss or fat loss. If muscle mass is increased by the use of heavy weights and eating enough to fuel the growth of new muscle tissue, body composition can be changed to increase the percentage of muscle compared to the percentage of body fat. But for weight loss, you may experience better results from incorporating more cardio exercise, which does typically result in weight loss and/or fat loss.

Your genetic profile indicates that your body composition response to strength training is BELOW AVERAGE,

compared to others with a more favorable genotype. While you are likely to see improvements in strength and muscle tone, you may see only small effects from strength training on your body weight and body fat percentage. For optimal weight and fat loss results, include cardio on most days of the week, stick to a healthy, lower-calorie diet and include heavy weight-training sessions 3 days per week.

SUCCESS STRATEGIES

Although resistance training does improve strength and the amount of muscle mass a person has, it does not typically burn enough calories to cause clinically significant weight loss or fat loss. For optimal body composition with less body fat, you should include 200 to 300 minutes of cardio on most days of the week and adhere to a healthy, reduced-calorie diet.

RELATED GENES / SNPS

NRXN3, GNPDA2, LRRN6C, PRKD1, GPRC5B, SLC39A8, FTO, FLJ35779, MAP2K5, QPCTL-GIPR, NEGR1, LRP1B, MTCH2, MTIF3, RPL27A, SEC16B, FAIM2, FANCL, ETV5, TFAP2B

The genes and their associated SNPs that are included in this category all have been shown to have significant associations with a person's ability to improve their body composition and decrease their body fat percentage from resistance exercise. Resistance training, or weight training, improves strength and the amount of muscle a person has. Weight training can also reduce the percentage, and sometimes amounts, of body fat. An improved body composition, which is a higher proportion of muscle to body fat, contributes to a leaner look and, potentially,

BODY COMPOSITION RESPONSE TO STRENGTH TRAINING

For optimal results from resistance training, it is important to provide your muscles with a sufficient stimulus that they are pushed to change. Many women, especially, do not lift heavy enough weight to either build muscle or get stronger. Make sure that you feel challenged by the last few reps of every set of an exercise that you do.

- You may also benefit from trying different forms of resistance training. Barbell-type workouts that focus on challenging weights with high reps may produce a greater calorie burn that results in more fat loss. Kettlebell workouts may provide a more endurance-based approach that leads to a greater calorie burn.

- Include at least one day of power training with significantly heavier weight. Power training entails doing fewer repetitions of heavier weights. Instead of doing 3 sets of 8 to 15 repetitions, you might choose a heavier weight and do 1 to 3 sets of 5 to 8 reps with 2 to 3 minutes of rest in between sets. If you participate in power training, build up a base level of strength following a traditional resistance-training program for at least 6 to 8 weeks before you start power training. Give yourself 2 to 3 days of recovery between power training sessions.

- Make sure to stick to a healthy, reduced-calorie diet for optimal fat loss.

a greater number of calories burned each day.

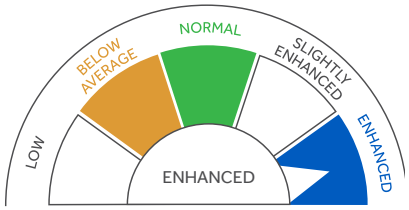
Although resistance training alone has not been shown to produce clinically-significant weight loss (because weights workouts do not burn as many calories as cardio), people with the more 'favorable' genotype in a large study experienced an improved ability to lose weight and reduce their body fat percentage with resistance training. Those with the 'unfavorable' genotypes showed a decreased ability to lose weight and reduce body fat percentage from resistance training. When you are trying to lose weight, it is very important to include resistance training in your routine. Resistance training can minimize or prevent that loss of muscle mass that occurs with weight loss when you are dieting.

Our analysis investigated which genotype for these genes was present in your DNA. Your rating of either ENHANCED, NORMAL or BELOW AVERAGE reflects whether your genotypes included those that carried a risk of an enhanced or reduced HDL response to cardio exercise.

HDL RESPONSE TO CARDIO

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits an **ENHANCED** HDL response to cardio exercise. Your score reflects the fact that your genotype showed the 'favorable' gene combinations. This suggests that you are likely to experience a substantial beneficial boost to your HDL levels from a regular cardio exercise program.



Your genetic profile indicates that your HDL response to cardio is ENHANCED.

For optimal results, do cardio five or more days per week.

SUCCESS STRATEGIES

Your genotype suggests that you can successfully raise your HDL levels with regular cardio. To obtain this benefit, the key is consistency. Every workout you do will boost HDL levels, but to maintain the effect you need to exercise on a regular basis, at least three to four days per week.

- Higher intensities may give you a greater boost. Aim to push past your comfort zone by moving a little harder or faster during your cardio workouts.
- What you eat is crucial to help normalize all of your cholesterol levels. A diet high in fiber-filled plant foods and low in saturated animal fats will help lower your total cholesterol, LDL cholesterol and triglyceride values.

RELATED GENES / SNPS

APOE

The gene and associated SNPs included in this category have been shown to have significant associations with a person's HDL cholesterol response to cardio exercise. HDL is a protein particle in the blood that carries cholesterol to the liver, helping to clear it from the blood. Excess cholesterol lingering in the blood can contribute to plaque that causes heart disease. So having higher levels of HDL is beneficial—which is why it's considered "good" cholesterol. Even one session of cardio exercise can boost HDL, and regular exercisers tend to have higher HDL.

This gene plays a role in the HDL response to cardio. One large study had men and women exercise for 30 to 50 minutes, 3 times a week for 5 months. Those people with the more "favorable" genotype experienced greater than average boosts to their HDL levels. Those with the 'unfavorable' genotype showed a decreased response: smaller increases in HDL.

EXERCISE

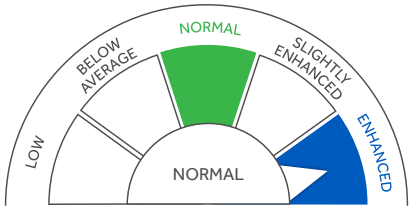
HDL RESPONSE TO CARDIO

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of either ENHANCED, NORMAL or BELOW AVERAGE reflects whether your genotypes included those that carried a risk of an enhanced or reduced HDL response to cardio exercise.

GLUCOSE RESPONSE TO CARDIO

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits an **ENHANCED** glucose response to cardio exercise. Your score reflects the fact that your genotype showed the 'favorable' gene combinations. This means that you are likely to experience decreases in glucose and, as a result, improved insulin resistance from doing cardio exercise at least 2 to 3 times per week.



Your genetic profile indicates that your glucose response to cardio is ENHANCED.

You are likely to experience beneficial decreases in blood glucose from 2 to 3 days per week of cardio exercise. You can enhance the benefits of exercise by working out harder and/or longer, and adding resistance training to your routine.

SUCCESS STRATEGIES

While you may experience improvement in blood glucose from exercising 2 to 3 days per week, you are likely to experience greater benefits by exercising more. Aim for at least 3 to 4 days per week of cardio.

- Find ways to stick to your routine, because the beneficial effects of exercise on blood glucose come from consistency.
- Add resistance training 2 to 3 nonconsecutive days per week to your workout routine to enhance the benefits of regular exercise.

RELATED GENES / SNPS

PPARG

The gene and associated SNPs included in this category have been shown to have significant associations with a person's glucose response to cardio exercise. Glucose is one of the body's main sources of energy and it comes from the breakdown of carbohydrates in the diet. Brain and nerve cells, as well as red blood cells, exclusively use glucose for energy. That's why blood glucose is maintained at constant levels—so that all the cells in the body that need it can access it. If blood glucose levels rise and stay high, eventually insulin resistance and diabetes can develop. Exercise helps regulate blood glucose levels because every session of exercise uses glucose in the muscle for energy, and the blood glucose supply is then tapped into to replenish the muscle reserves.

EXERCISE

GLUCOSE RESPONSE TO CARDIO

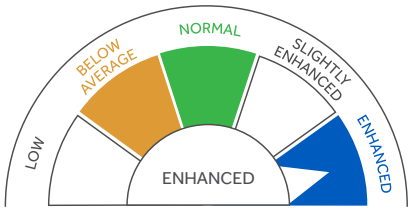
This gene seems to play a role in the glucose response to cardio and appears to be a reliable indicator of whether exercise will have beneficial effects on insulin resistance. Several studies involved a variety of individuals, both diabetics and non-diabetics, performing regular cardio for 2 to 3 days per week for up to 5 months. Those people with the more 'favorable' genotype experienced greater-than-average clearance of blood glucose. Those with the 'unfavorable' genotype showed a decreased response, or smaller drop in glucose levels. People with this genotype also had a decreased weight-loss ability—they loss less weight compared to people with different genotypes.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of either ENHANCED or NORMAL reflects whether your genotypes included those that carried a risk of an enhanced or reduced glucose response to cardio exercise.

INSULIN SENSITIVITY RESPONSE TO CARDIO

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits an **ENHANCED** insulin sensitivity to cardio exercise. Your score reflects the fact that your genotype showed the 'favorable' gene combinations. This suggests that you are likely to see beneficial improvements to your insulin sensitivity if you exercise regularly.



Your genetic profile indicates that your insulin sensitivity response to cardio is ENHANCED.

Performing 3 or more days of cardio per week should improve your glucose uptake. You can optimize these effects by working out more than three days per week and including resistance training in your workouts.

SUCCESS STRATEGIES

- The more often you exercise, the greater the benefits. For optimal insulin response, perform cardio exercise at least three to four times a week and stick to it.
- Strength training can also improve insulin sensitivity, so include some form of resistance training two to three times per week, targeting all the major muscle groups as part of your weekly routine.

RELATED GENES / SNPS

LIPC

The gene and associated SNPs included in this category have been shown to have significant associations with a person's insulin sensitivity in response to cardio exercise. Insulin is a hormone that plays a crucial role in delivering glucose, a form of sugar, in the blood to cells in the body that use it for energy. In a healthy person, cells are sensitive to this action of insulin and blood glucose levels are kept in their optimal range. If insulin sensitivity declines, a person may become insulin resistant. This keeps blood glucose levels high and diabetes can develop.

Even one session of exercise can improve insulin sensitivity. Exercise also helps keep blood glucose levels low because exercising muscles can absorb glucose without needing insulin to do so. Exercise over time can prevent diabetes—and it can help those who already have it.

EXERCISE

INSULIN SENSITIVITY RESPONSE TO CARDIO

This gene seems to play a role in the insulin sensitivity response to cardio. One large study had men and women perform cardio exercise at a moderate-to-high intensity for 30 to 50 minutes, 3 times a week. Those people with the more 'favorable' genotype experienced greater than average improvements in their insulin sensitivity. Those with the 'unfavorable' genotype were less likely to improve their insulin sensitivity by exercise.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of either ENHANCED, NORMAL or BELOW AVERAGE reflects whether your genotypes included those that carried a risk of an enhanced or reduced HDL response to cardio exercise.

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LINKS TO RELATED STUDIES:

FOOD – FAT UTILIZATION

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