NUTRIGENETICS:
The Science Behind The Success

Weight Loss, Weight Management, Health, And Wellness Powered By Your Unique DNA

plainsmart™
Wellness and Weight Management Clinic

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Isn't DNA amazing? DNA can reveal our ancestors from earliest times and help solve some of the world's most baffling mysteries. And now, through evidence-backed research that has been published in peer-reviewed journals, scientists are able to isolate and investigate more than 40 genetic markers specific to nutrition and fitness.

From a simple saliva sample, geneticists analyze a person's unique DNA to develop recommendations for:

- Weight loss and weight management
- Nutrient metabolism
- Cardiometabolic (heart) health
- Food intolerances
- Eating habits
- Fitness performance
- Injury risk

Nutrition professionals, such as Registered Dietitian Nutritionists (RDNs), can use individual genetic codes to counsel people who are concerned about weight, or who have health issues such as high cholesterol or diabetes. Armed with our DNA profiles, and results from other diagnostics such as body composition analyses and medical history review, these nutrition professionals develop personalized programs to put our DNA to work for us.

In the following chapters, we'll discuss each of the nutrigenetic topics to decode how specific genes change the ways we respond to dietary components and enable us to use nutrition and activity to help prevent, manage, or improve health issues, as well as to uncover the secrets of overall wellness.

CHAPTER 1

Understanding your nutrient metabolism

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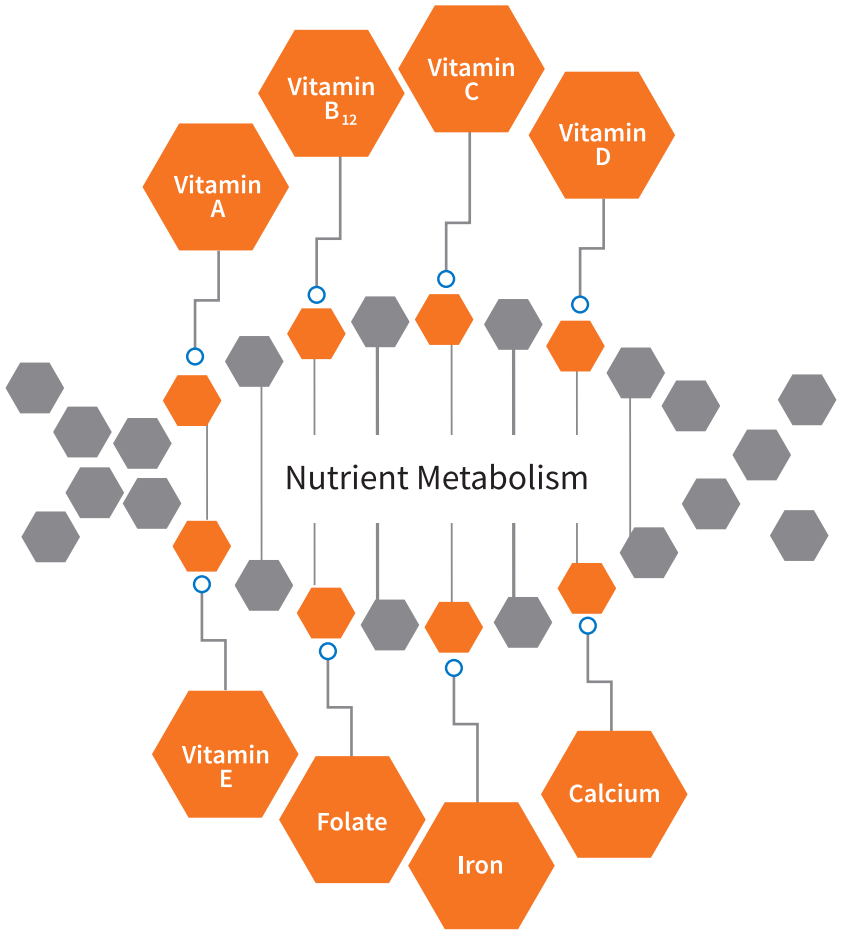
Different versions of our genes can make us respond differently to certain components in our food. Our most effective dietary consumption depends on our specific variants for these nutrient-related genes.

Through nutrigenetics, scientists and nutrition professionals also learn more about the body's ability to absorb, process, and create a number of vitamins and minerals, such as vitamin B_{12}, folate, and calcium. For example, B_{12} is critical for normal nervous system functioning, yet research shows that at least half of the people tested are at a higher risk of vitamin B_{12} deficiency based on their genetic variants.

Vitamin A is important for eye health and vision, as well as for a strong immune system and healthy reproduction. Beta-carotene, an antioxidant found in orange/red fruits and vegetables such as pumpkin, carrots, sweet potatoes, and butternut squash, is essential for the formation of active vitamin A.

But it's our genes that determine how efficient we are at converting this beta-carotene into vitamin A. Research shows that people with certain genotypes require a higher concentration of what is known as pre-formed vitamin A in their diets, that is, vitamin A that doesn't have to be converted from beta-carotene. Foods such as fish, liver, eggs, and dairy products provide this pre-formed Vitamin A.



Are you able to convert beta-carotene into vitamin A properly, or are you the 1 person in 5 who struggles to create vitamin A?

From a simple saliva sample, nutrigenetics scientists can decode your DNA to determine your ability to convert beta-carotene to vitamin A.

*As reported by Nutrigenomix, a global leader in nutrigenetics and genome research and analysis.

What is the likelihood that you'll have such genetic variants? Take a look at the chart below.

People with Genetic Risk Variants*

Inefficient conversion of beta-carotene to Vitamin A for eye, immune, and reproduction health	1 in 5
Vitamin B_{12} deficiency risk for brain and nervous system function	1 in 2
Inefficient Vitamin C absorption and processing for immune function and tissue development	1 in 5
Vitamin D deficiency risk for calcium metabolism and absorption	4 in 5
Vitamin E deficiency risk for blood clotting	1 in 20
Risk for heart disease and stroke from inefficient folate absorption and processing	2 in 3
Risk for liver disease, arthritis, and heart conditions from iron overload	1 in 150
Low iron status for immune system and other functions	2 in 3
Risk for inefficient calcium absorption for bone tissue, muscles, nerves, and blood clotting	1 in 6

It's true: with a simple DNA test, nutrition professionals can help you dig deeper into your unique metabolism for a nutrition plan designed for your health and wellness goals.

CHAPTER 2

Understanding your cardiometabolic (heart) health

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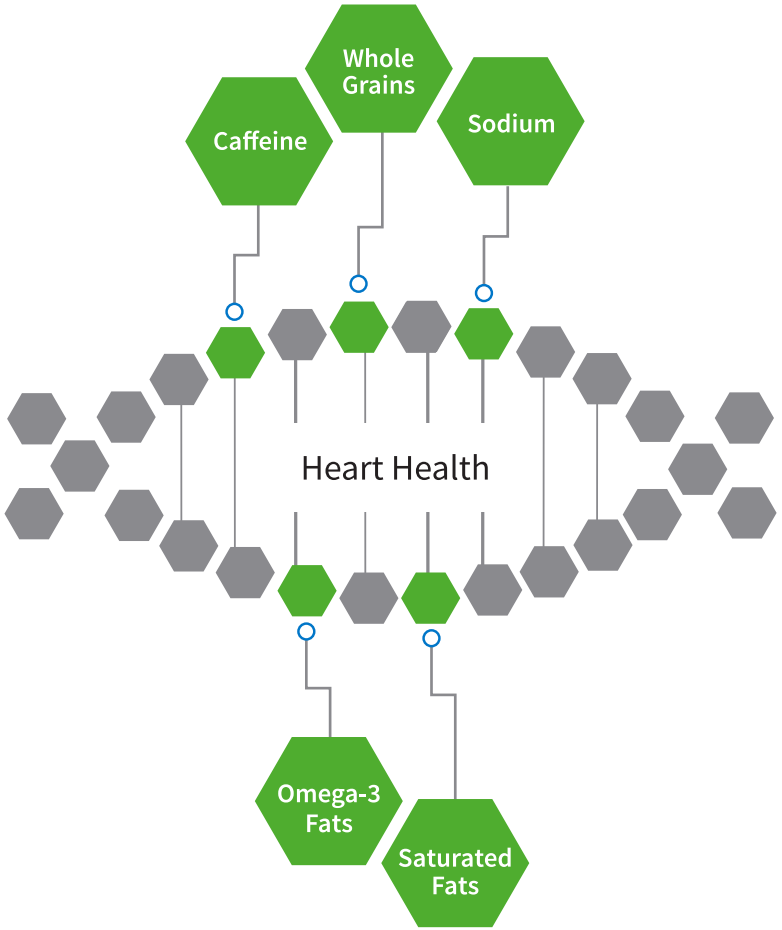
We all know it's true – what we eat and drink affects our health. And certain foods and beverages have very specific effects on our cardiometabolic health … our heart health.

Take caffeine … people around the world love their caffeine! Whether in coffee, tea, colas, or today's popular energy drinks, caffeine is the most widely consumed stimulant in the world. Yet the research has been inconsistent about heart health when it comes to caffeine, and particularly your coffee intake.

Some studies report a link between high coffee consumption and an elevated risk of high blood pressure and heart disease, while other studies have shown that caffeine has no effect, or may even have a protective effect, with moderate intake.



Are you able to break down caffeine more efficiently and actually see benefits from coffee? Or are you one of the 50% of people who process caffeine too slowly?

If you are, you will increase your chances of heart health issues with every cup!

Two landmark studies** recently determined that the effects of coffee on cardiovascular disease depend on our genetics. Variations in the CYP1A2 gene affect the rate at which people break down caffeine, which then affects heart health. People with the genetic variation that breaks down caffeine more slowly are at greater risk of high blood pressure and heart attack. Those with another genetic variant, however, actually have a lower risk of heart disease with moderate coffee consumption than do those who consume no coffee at all!

By decoding your DNA, you can learn about your own response to this beloved beverage (and the caffeine it contains), as well as other important nutrition factors for your unique heart health needs, such as your metabolism of whole grains, sodium, and fats. For instance, some people actually require *higher* levels of healthy fats in their diets for their overall wellness!

This chart gives you a peek into these insights.

People with Risk Variants*

Risk from caffeine on heart health	1 in 2
Require additional whole grains to combat development of type 2 diabetes	1 in 2
Risk for elevated blood pressure with higher amounts of sodium	7 in 10
Require additional omega-3 fats for better heart health and low triglyceride levels	1 in 2
Risk for obesity and cardiovascular disease from a diet high in saturated fat	1 in 7

When you know your own unique DNA variants, you can work with nutrition professionals to modify your diet and lifestyle according to your individual heart health requirements.

*As reported by Nutrigenomix, a global leader in nutrigenetics and genome research and analysis.

**Cornelis, et al. Coffee, CYP1A2 genotype, and risk of myocardial infarction. Journal of the American Medical Association. 2006; 295:1135-41.

Palatini P., et al. CYP1A2 genotype modifies the association between coffee intake and the risk of hypertension. Journal of Hypertension. 2009; 27:1594-1601.

CHAPTER 3

Understanding your energy balance requirements

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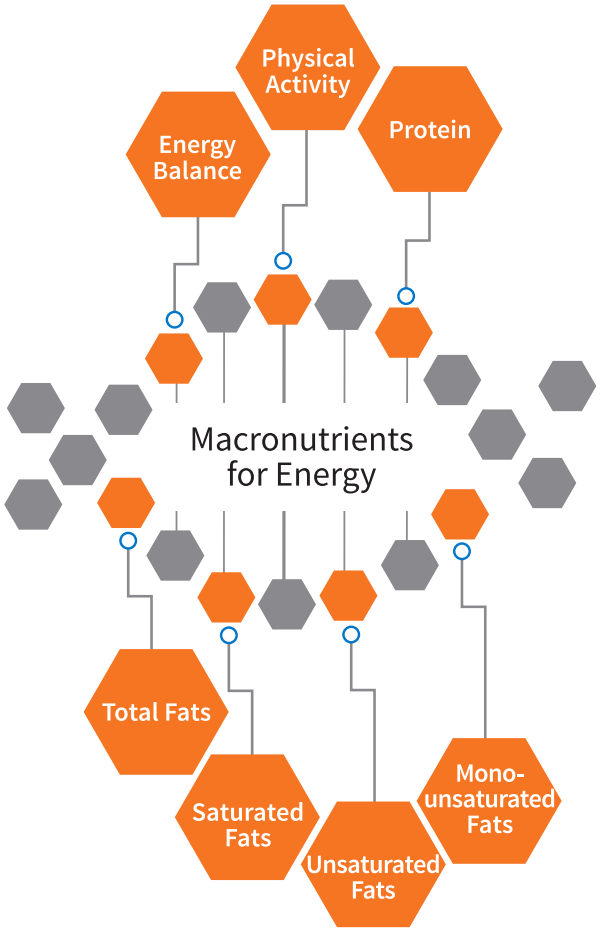
Understanding your energy balance requirements

At the most basic level, weight management and weight loss seem relatively simple – determine a daily calorie intake that will give you just the right amount of energy to get you successfully through your day. This is much easier said than done, however … different people require different percentages of proteins, carbohydrates, or fats in their diets.

This ratio of input (carbs, proteins, fats) to output (physical activity) affects not only our abilities to maintain or lose weight, but also the state of our cardiovascular health and mental functioning, as well as our abilities to combat insulin resistance and lowered metabolic rates.

Because our daily physical activity often varies – along with the energy required for more strenuous activities! – a simple "eat less, move more" strategy can leave our heads spinning, our stomachs growling, and our weight loss results stagnant, at best!



What is *your* perfect calorie input vs. activity output for sustained weight management? What portion of these calories should be from carbohydrates vs. proteins and fats?

Your DNA helps determine the amount – and proportion – of calories you really need.

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Your unique genetics help identify your Resting Metabolic Rate (RMR) and the amount of calories you need to maintain normal body functioning. People with at-risk response variants of the UCP1 gene, for example, have a lower RMR and thus require fewer calories every day, especially when we're trying to lose weight.

Other genes, such as the FTO gene, indicate what percentages of your diet are best for proteins and fats because of the unique response variants you possess.

By considering these factors, nutrition professionals develop weight loss programs to increase your energy levels and metabolism, keep you satisfied, and continue to see results for long-term and life-changing weight and health management.

(And, yes, your genetics play a significant role in what types of physical activities help you lose and maintain healthy weight. More on this in Chapter 6.)

How likely are you to have specific response variants? The chart below lays it out for you.

People with Specific Response Variants*

Need to take in fewer calories due to lower Resting Metabolic Rates	7 in 10
Can achieve greater weight loss from a high protein diet	1 in 6
Can achieve greater weight loss from a low fat diet	1 in 10
Can achieve greater weight loss from a diet lower in saturated fat	2 in 3
Can achieve greater weight loss from a diet higher in monounsaturated fat	1 in 7
Can achieve greater weight loss from certain physical activities	1 in 6

Sustained weight loss and weight management plan are possible when you understand your body's individualized genetic needs and embark on a program of lifestyle changes that will enable you to slim down and get healthy for the long term.

CHAPTER 4

Understanding your likelihood for gluten or lactose intolerances

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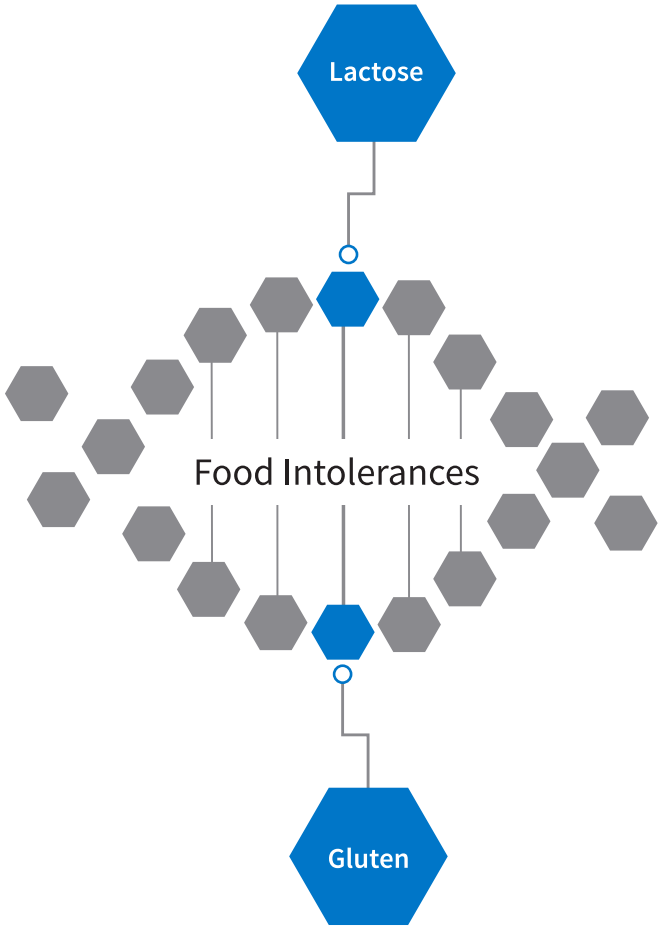
Are you curious about gluten sensitivity, gluten intolerance, and even celiac disease? You're not alone. The abundance of information on the Internet, and the popularity of gluten-free foods and diet plans have many of us wondering about our own tendencies.

The answers are in our genetics.

Our unique DNA contains multiple genes, markers, and risk variants that determine our likelihoods for developing gluten as well as lactose intolerances. Nutrition professionals then use these results to recommend the right foods for your personal genetic predispositions.



Is gluten-free nutrition best for you? Are gluten-free options always healthier, even if you don't have an intolerance?

For some people, a low-gluten or gluten-free diet is necessary for better health, but not best for everyone … your DNA has the answer.

*As reported by Nutrigenomix, a global leader in nutrigenetics and genome research and analysis.

Gluten-free diets are not best for everyone – processed gluten-free products often have more calories, sodium, added sugar, and fat compared to their gluten-containing counterparts. But for some people, a diet low in gluten, or even gluten-free, is necessary for better health.

If your HLA gene variant does indicate a likelihood for gluten intolerance, lowering the amount of gluten in your diet can help ease digestion problems, nutrient malabsorption, and anemia. So plan to enjoy rice, quinoa, corn, buckwheat, amaranth, and millet without any issues. Go easy on oats and wheat, though, or even just eliminate them if you experience unpleasant symptoms of intolerance.

Your MCM6 gene can also help you understand your ability to break down lactose, by identifying whether you are likely to produce enough of the enzyme necessary to break down the lactose you consume. With certain risk variants, you might not be able to tolerate milk or other dairy products.

Who is most likely to have these risk variants? Check out this chart.

People with Risk Variants*	
African Americans with likelihood of lactose intolerance	8 in 10
Asians with likelihood of lactose intolerance	9 in 10
Caucasians with likelihood of lactose intolerance	3 in 10
People likely have a low risk of gluten intolerance	7 in 10
People likely have a medium risk of gluten intolerance	2 in 10
People likely have a high risk of gluten intolerance	1 in 10

By understanding your own genetic predispositions, you can eliminate digestion issues, absorb vitamins and minerals properly, and increase your energy levels by eating the foods that your body needs, and avoiding the ones to which your body reacts poorly.

CHAPTER 5

Understanding eating behaviors determined by your genetics

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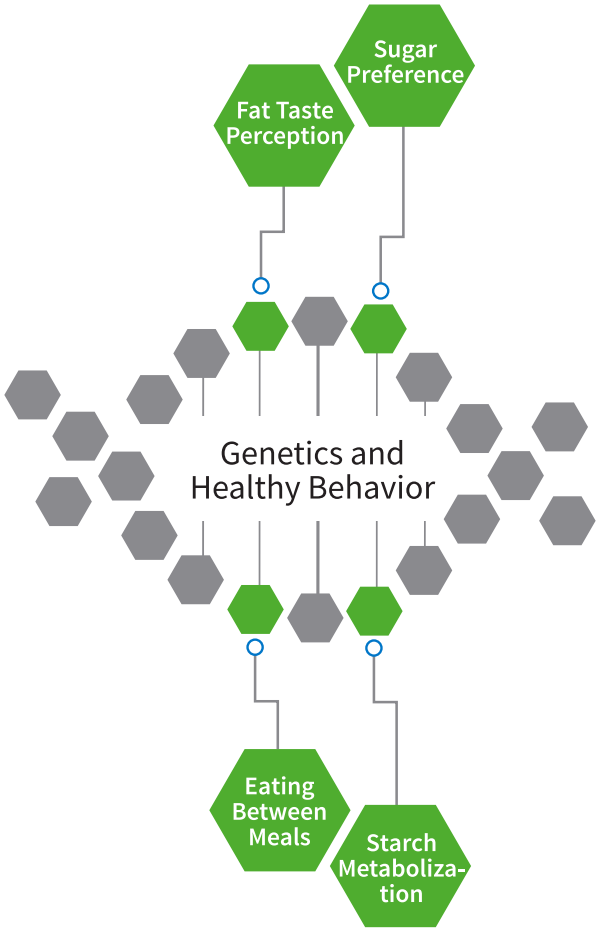
Understanding eating behaviors determined by your genetics

Are our eating behaviors really related to our genetics? The answer is yes, but there's more to it than that. Certainly our eating behaviors are learned through our environments, our upbringings, and our basic habits. But, genetically, we do have certain preferences, such as those for sugar, fat, and even for snacking between meals!

Understanding these genetic preferences can help us pinpoint why we seem to have the same issues over and over again that stand in the way of our plans for better nutrition and a healthier lifestyle. For example, some people clearly perceive the taste of fat in their foods and are considered "super tasters" who, genetically, need less fat in their foods to feel satisfied.



Are you more likely to overconsume fatty foods or sweets? Are you constantly snacking and find it difficult to determine if you are hungry or if you just have a desire to eat?

Your DNA can help pinpoint your genetic predispositions and lead to a healthier lifestyle!

*As reported by Nutrigenomix, a global leader in nutrigenetics and genome research and analysis.

On the other hand, people who are unable to perceive fat in their foods, or "low tasters," need to consume more fat to sense this taste, and because of this preference, can unintentionally consume more fat than recommended.

Some gene variations, which affect the part of the brain that controls hunger, appetite, and sugar intake, are less susceptible to appetite regulation and hunger cues. This leads to overeating, snacking between meals, and the overconsumption of sugar.

This chart shows the likelihood you'll have one of these genetic predispositions.

People with Specific Genetic Variants*	
An enhanced ability to sense the fatty taste of foods	7 in 10
An elevated risk of over-consuming sugar	1 in 5
An enhanced likelihood to eat between meals and not sense "full" cues	1 in 2
A decreased ability to digest starches	1 in 10

The good news is that you can always take steps to maintain healthy eating behaviors, no matter what your genetic predispositions might be. Knowing your genetic tendencies can help you choose the best strategies for your healthy eating behavior and preferences.

CHAPTER 6

Understanding your motivation to stay active

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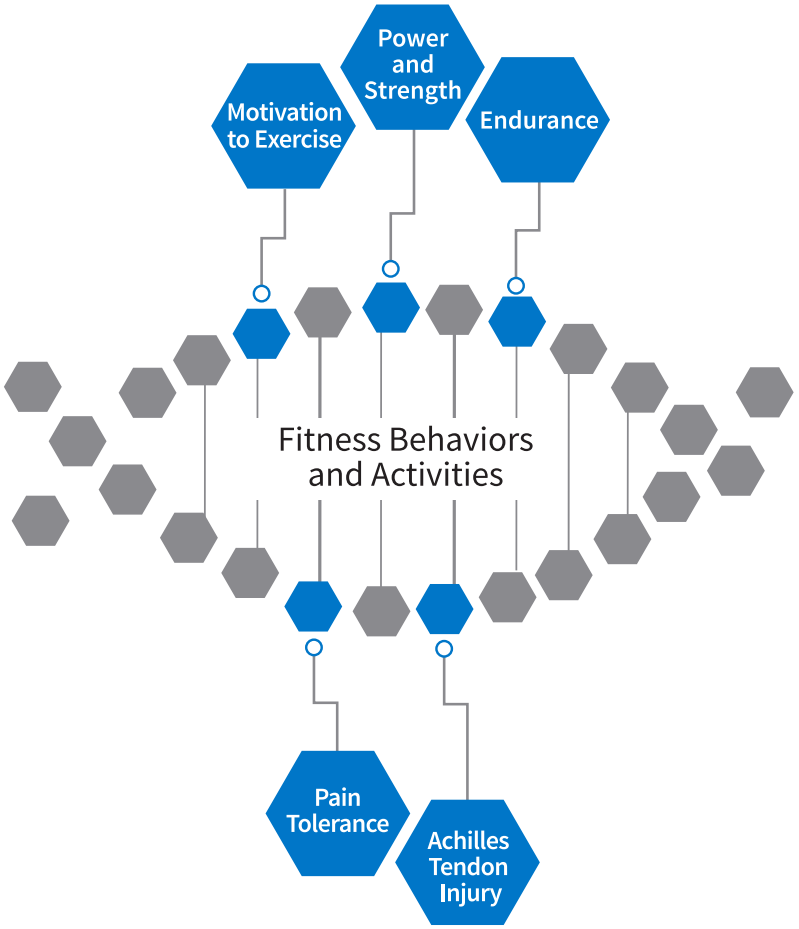
Understanding your motivation to stay active

Your attitudes toward physical activity and exercise, the effects it has on your mood, and your ability to complete high-endurance or power and strength activities affect whether you will maintain – or even start – an active lifestyle. And now evidence-based DNA research tells us why we have the attitudes we do.

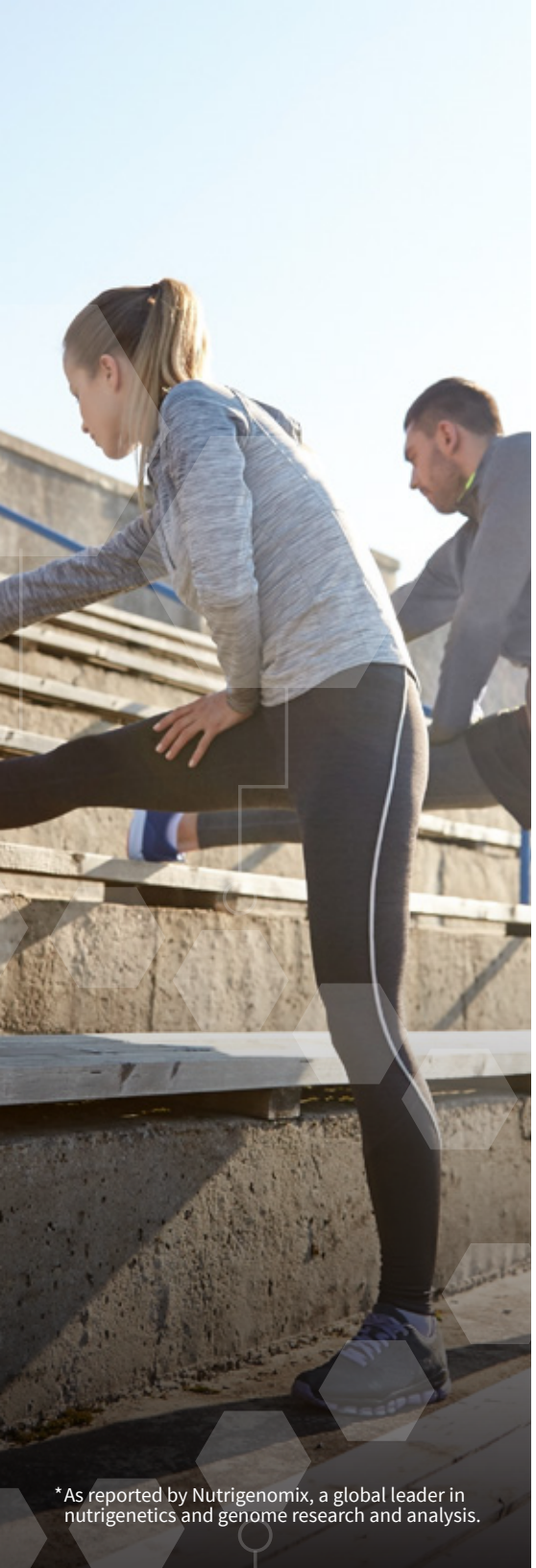
Multiple genes work in our brains and throughout our endocrine systems to influence our nervous systems, musculature, blood vessels, and our individual hormone responses. These responses govern our conversion capabilities and energy balances, and are part of the complex reasoning behind the enjoyment and good moods some of us get from physical activities.

Our genetics reveal whether we have an enhanced ability for power and strength exercises rather than high-endurance activities. Our DNA also shows whether we tend to have a higher pain tolerance or even an elevated risk of Achilles tendon injury.



How can you find a physical activity routine that works for you? How can you stay motivated and energized?

When you understand your body's unique genetic preferences, you're more likely to find the right regimes you enjoy and are motivated to maintain.



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Whether you are interested in gaining a more effective workout routine for weight loss or are an athlete looking to boost your performance, your unique DNA provides insight into the best fitness activities for you to accomplish the best and most long-lasting results.

Want to know what your likelihood for these preferences is? Take a look at this chart.

People with Specific Genetic Variants*

Likelihood of experiencing greater enjoyment and positive mood from exercise	2 in 3
Enhanced likelihood of and motivation to exercise	1 in 5
Slight advantage to excel in power and strength activities	1 in 2
Significant advantage to excel in power and strength activities	1 in 3
Slight advantage to excel in endurance activities	1 in 4
Significant advantage to excel in endurance activities	1 in 20
Heightened pain tolerance	3 in 4
Elevated risk for Achilles tendon injury	1 in 5

With your DNA results, your nutrition professional can also help develop an activity program unique to your body's needs and advantages, and that complements a nutritional plan personalized for you. Understanding your genetic preferences and predispositions is the first step toward creating a healthier lifestyle and reaching your long-term weight and wellness goals.

About PlainSmart Wellness and Weight Management

The founding principle behind PlainSmart Wellness and Weight Management is that real people need real solutions created just for you and your unique needs and goals. We know that fad diets and one-size-fits-all plans are boring, all too typical, and often just don't work.

That's why we decided to offer everyday people the tools and counseling to actually change your life:

- Science-based diagnostic tools, such as DNA testing and body composition analyses, as well as the most current technologies for monitoring success
- Personalized nutrition coaching and fitness advice from Registered Dietitian Nutritionists (RDNs)
- Healthy and delicious foods that satisfy both your taste buds and your appetite.

As you learn what your unique DNA reveals about your health and wellness needs, our nutrition professionals are here to help you make the most of this information. Armed with your genetic report and your body composition analysis results, our RDNs also consider your lifestyle, medical history, food and fitness preferences, and any additional health and wellness needs to develop a program unique to you. And we work with you individually so you receive the one-on-one attention, education, and empowerment you deserve.

You are embarking on a path to a healthier life and we would be honored to partner with you on this journey.

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