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ExtendRX

"Extend" *how you feel, function & look for a healthier, longer life.*

FitDNARX
Unlock the power of your genetic code

Created for: Michael Kummer

www.FitDNARX.com

Welcome to Your ExtendRX Personal Report

ExtendRX Personal Report
June 17, 2019

Congratulations! You are holding in your hands the codes to maximizing your health, fitness and well-being—in depth insights that, up until now, have never been available. We have always inherently understood that everything from wrinkles to heart disease "runs in the family," or is passed down from generation to generation through our DNA. But until now, figuring out exactly what traits we've inherited, and more importantly, what to do with that knowledge, took a lifetime of trial and error to sort through and often remained a mystery.

No more. Scientists can now identify and analyze dozens of traits embedded in your DNA that influence how your body works and how your diet, exercise and lifestyle habits and behaviors directly impact how you feel, function and look - right down to the cellular level. This report not only provides you with a roadmap of your specific genes, but also gives you a concrete action plan for optimizing your genetic potential with this knowledge. *This report will help you understand yourself and take steps to make you feel, function and look better immediately and long-term for a healthier, longer life.*

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 Traits Were Analyzed?

To produce your results, we looked at genes that are related to three major health categories: How You Feel, How You Function and How You Look.

What Can Your Results Tell You?
Or Why Is Your Genotype Important?

There's a saying when it comes to genetics: Your genes load the rifle; but something else pulls the trigger. That is to say that *how genes are expressed is affected by your lifestyle, as well as other environmental factors*. Not all of those factors are within your control, of course, but many are. Knowledge is power.

To empower you with the best genetic testing knowledge possible, we have established stringent criteria for studies that we use to help us evaluate the potential impact of your genotype for each gene tested. We select the largest and most

scientifically valid genome-wide association studies to calculate a score for the different genes or gene combinations for all genes tested. Your results indicate which gene combinations you have in each category, and you receive a rating for each trait in a category. The studies we used as the basis for our recommendations are available for reference in this report.

Your ratings reflect your potential level of response to diet, exercise, lifestyle and other behaviors with regard to how your body feels, functions and looks, including an array of traits ranging from how likely you are to crave sugar to your risk for mental acuity decline, based on your genetic analysis. Keep in mind that the presence of certain genotypes does not mean that any given outcome is certain. So 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. The analysis simply suggests that there is a greater chance that you will, but behavioral, environmental and other factors can also play a role in whether you will express that trait and exhibit that result. However, these results may provide important insights into how your body might perform optimally. Based on this information, we provide personalized suggestions that can help you achieve optimum results.

Personalized medicine, or individualized advice based on a person's genetic profile, is still in its infancy because there is still much to be understood about genes and their interactions with each other and other influences such as diet, exercise and the environment. Genetic research is a relatively new field and many new discoveries are being made every day. We will maintain a continually updated research database, with analyses that will be modified as new and better research becomes available.

On the following pages you will see a summary of your results, followed by a detailed explanation and success strategy. You can't change your genes, but you can control the diet, exercise and lifestyle behaviors that influence those genes and take steps starting today to minimize genes that may cause undesirable outcomes and to maximize your health and wellness genetic potential.

What You'll Learn About You

On the following pages you will see a summary of your results, followed by a detailed explanation and strategy for success. This guidance can help you adopt the diet, exercise and lifestyle behaviors that will have you feeling, functioning and looking your best.

REPORT SUMMARY

LOOK

FEEL

FUNCTION

REPORT SUMMARY

LOOK

Sun Sensitivity	UNFAVORABLE	RF4, LOC105374875, NTM, TYR, HERC2, MC1R, CPNE7, MC1R, RPS2P1, ASIP
Skin Aging	NORMAL	IRF4, SPATA33, RALY/ASIP, BNC2
Skin Glycation	NORMAL	AGER, GLO1
Facial Aging	NORMAL	STXBP5L
Strech Marks	BELOW AVERAGE	ELN, SRPX, HMCN1, LOC105373353
Fat Loss Response To Cardio	LOW	ADRB2, LPL
Body Composition Response To Strength Training	ENHANCED	NRXN3, GNPDA2, LRRN6C, PRKD1, GPRC5B, SLC39A8, FTO, FLJ35779, MAP2K5, QPCTL-GIPR, NEGR1, LRP1B, MTCH2, MTIF3, RPL27A, EC16B, FAIM2, FANCL, ETV5, TFAP2B

FEEL

Intrinsic Motivation To Exercise	MORE LIKELY	BDNF
Addictive Behavior And Stimulus Control	LESS LIKELY	DRD2
Impulse Control And Taste Preference With Aging	NORMAL	FTO
Sleep Duration	ABOVE AVERAGE	ABCC9, LOC101927400, DRD2
Sugar Intake	NORMAL	SLC2A2, GLUT2

REPORT SUMMARY

FUNCTION

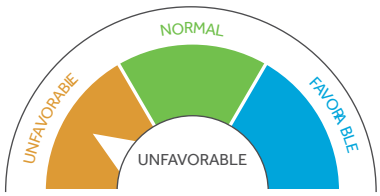
Age Related Hearing Loss	INCREASED	GRM7
Longevity	NORMAL	FOXO3, APOC1 (APOE-CI-CII)
Fitness Response To Cardio	BELOW AVERAGE	AMPD1, APOE
Systemic Inflammation	ABOVE AVERAGE	near CRP, APOC1 (APOE-CI-CII), HNF1A
Polyunsaturated Fatty Acid Tendency	NORMAL	FADS1-2
Cholesterol Response To Dietary Fat	NORMAL	LIPC
Insulin Response To Dietary Fat	NORMAL	FTO
Trig Response To Cardio	BELOW AVERAGE	CYYR1, GLT8D2, RBFOX1, ZNF385D
Lactose Intolerance	UNLIKELY	MCM6
Calcium Tendency	BELOW AVERAGE	CASR, DGKD, GCKR, LINC00709, CARS, LOC105370176, CYP24A1
Copper Tendency	BELOW AVERAGE	SMIM1, SELENBP1
Magnesium Tendency	NORMAL	MUC1, SHROOM3, TRPM6, DCDC5, ATP2B1, MECOM
Dietary Choline Levels	INCREASED	PEMT
Selenium Tendency	NORMAL	DMGDH
Zinc Tendency	ABOVE AVERAGE	CA1, PPCDC, LINC01420

LOOK

SUN SENSITIVITY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you an UNFAVORABLE level of sun sensitivity. That means that your skin is likely to burn after even relatively short amounts of unprotected exposure to the sun's UV rays. That also puts you at an increased risk for skin cancer. You obviously can't alter your genetic makeup, but you can greatly minimize your risk for both burns and long term damage by practicing sun safety.



Your genetic profile indicates that you are inclined to have an UNFAVORABLE level of sun sensitivity.

We recommend that you protect your skin from short term burning and the long term risk for skin cancer by taking extra steps to guard your skin against UV ray exposure.

SUCCESS STRATEGIES

It's hard to deny the pleasures of enjoying the outdoors in the warm sunshine. Fortunately, there are many ways to protect yourself from burning, even if you're among those who are most susceptible to the sun's UV rays.

Wear broad spectrum sun protection. There are many varieties of sunscreen to choose from, some more or less effective than others. Look for one that is broad spectrum, meaning that it protects against both the burning UVB rays and the deeper damaging UVA rays. For best protection, choose one that is rated sun protection factor (SPF) 30 or higher and at least 4 star UVA protection.

Be sure to apply it liberally. Studies show that most people apply less than half the amount they need for full-body protection. As a rule of thumb, you need about a tablespoon's worth for face, head and neck; 2 tablespoons for both

RELATED GENES / SNPs

IRF4, LOC105374875, NTM, TYR, HERC2, MC1R, CPNE7, MC1R, RPS2P1, ASIP

The genes and associated SNPs that are included in this category have been shown in studies to have significant associations with a person's level of sun sensitivity.

How sensitive you are to the sun relates to how easily (or not) your skin burns. Some people are genetically inclined to tan easily in response to sun exposure. Others, however, have skin that turns painfully red and/or even blisters from exposure to the sun's ultraviolet (UV) rays. Sunburns often take an hour or more of unprotected sun exposure to occur, but can happen in as little as 30 minutes. Your sun sensitivity is determined by a number of factors including having fair skin, light colored hair and taking medications such as certain antibiotics and NSAIDs that increase your skin's sensitivity to sunburn. Genes also play a major role in your level of sun sensitivity.

SUN SENSITIVITY

arms, and 4 tablespoons for torso (front and back) and both legs. Apply it 20 minutes before going out, so it has time to dry. Reapply every two hours, more if you're swimming or sweating heavily.

Seek shade during strong sun hours. The sun's rays are strongest from about 10 a.m. to 3 p.m. If you're going to be out all day, take extra protection in the form of a wide brimmed hat, a light cover up and/or an umbrella.

Keep unprotected exposure short. Some health experts worry that completely limiting unprotected exposure to the sun can put people at risk for vitamin D deficiency, since the most natural way to get vitamin D is exposing your bare skin to the sunlight. Fortunately, it takes very little exposure to make high amounts of vitamin D and the more sensitive you are to the sun, the easier it makes this essential nutrient. So as little as 10 or 15 minutes of midday sun, like what you would get during a quick walk on your lunch break, can produce 10,000 IU of vitamin D.

Check the UV Index. The UV Index is a rating scale of the intensity of the sun's UV rays. Most weather apps will list the UV Index, which ranges from 0 (low danger) to 11+ (extreme risk). Any reading of 3 (moderate risk) or higher requires precautions not to get burned.

Follow up research on a skin pigmentation genome-wide association study revealed that the T allele of the IRF4 gene is associated with an 87 percent greater risk of sun sensitivity. The variant acted much like a dimmer switch in that when the switch in the IRF4 enhancer is in the "on" position, ample pigment is made. In turn, that melanin pigment gets transferred to the skin cells near the surface of the skin and protects the skin from UV radiation in sunlight. If the switch is turned "off", as in the case with the T allele, the pathway is less effective and less melanin is ultimately produced, leaving you vulnerable to burning.

In another genome-wide association study of skin sensitivity and tanning response after exposure to sunlight in more than 10,000 men and women of European ancestry, researchers discovered that an A allele variation of the gene HERC2 (which is known as a pigmentation SNP) is associated with increased tanning ability and decreased risk of sun burning. Other research has found a strong link between genotype and hair and eye color and sun sensitivity (which is why fair skinned, blue eyed people are more likely to burn than those with darker complexions and darker hair and eye colors).

Because sun sensitivity can lead to sun damage and increases your risk for skin cancer, it's important for people who are most sensitive to the sun to balance their need for healthy sun exposure to get ample amounts of vitamin D with sun protection. High sun sensitivity risk alleles are most common in people of European descent and are generally not seen in those of sub-Saharan Africa or East Asian descent.

Though tanning is the result of an increased production of eumelanin and

LOOK

SUN SENSITIVITY

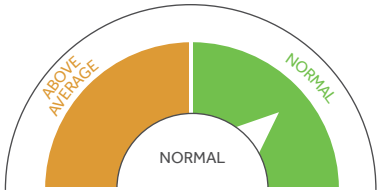
your skin's attempt to protect itself from further damage, it does not mean that good tanners are immune to sun damage or related skin cancer.

Our analysis investigated which genotypes for these genes were present in your DNA. Your rating of FAVORABLE, NORMAL, or UNFAVORABLE reflects your tanning response, which in turn reflects your level of sun sensitivity and likelihood of burning.

SKIN AGING

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you a NORMAL likelihood of developing age spots. That means your skin is likely to develop some spots overtime, but you aren't at a particularly high risk for early or excessive discoloration.



Your genetic profile indicates that you are likely to have a NORMAL level of skin aging as evidenced by age spots.

Because chronic, prolonged sun exposure is an independent risk for age spots, we recommend that you help maintain a healthy, youthful looking skin complexion by taking precautions to minimize sun damage and its symptoms.

SUCCESS STRATEGIES

Sun exposure as well as genetics are the culprits behind age spots. Since you're at an average risk for these patchy discolorations, you'll want to practice sun smart strategies to avoid or minimize spots.

Use sunscreen. Consistent sunscreen use is your best protection against future age spots. Wear a sunscreen of at least SPF 30 and with 4 star UVA protection to minimize short and long term skin damage. Reapply every two hours, more often if you've been swimming and/or sweating. Be especially vigilant if you're going to be out for any length of time between the peak sun hours of 10 a.m. and 3 p.m.

Protect high damage zones. Your face, head (if your hair is thinning), forearms and hands are the areas that spots are most likely to appear because they see the most sun. Use an umbrella to seek shade at the beach and pool. Wear a

RELATED GENES / SNPs

IRF4, SPATA33, RALY/ASIP, BNC2

The genes and their associated SNPs included in this category have been shown in studies to have significant associations with a person's susceptibility to visible symptoms of skin aging, particularly lentigines, pigmented patches of skin more commonly called "age spots."

Lentigines are brown lesions that form on the skin from chronic sun exposure and other factors. They generally appear on the face, hands, forearms and upper chest. Though they take years to develop, these tan or brown spots seemingly appear out of nowhere and are very common in adults over the age of 50. Though age spots are harmless, people may not like the way they look and often turn to bleaching creams or other dermatological treatments to fade them.

Age spots are primarily caused by years of prolonged sun exposure as melanin becomes concentrated in small patches. Unsurprisingly, fair skinned people are more at risk for age spots. Age spots are also caused by an underlying genetic

SKIN AGING

broad brimmed hat and a light, but tightly woven cover-up when you're out for long periods of time in strong sunlight.

Treat spots early. If you should notice some spots, you can diminish their appearance by using an over-the-counter fade cream. Look for one that contains hydroquinone, glycolic acid or kojic acid. Use only as directed and be aware that some of these products, particularly those containing hydroquinone, may cause temporary skin irritation.

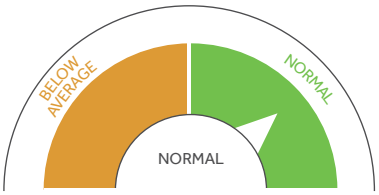
component that is independent of melanin production, however, according to a study of more than 2,800 men and women of North European ancestry, which identified four genes with strong associations to age spots that were at least partially independent of skin color. Women also seem to be at a higher risk, though those findings are inconclusive and the reasons why are still unclear.

Our analysis investigated which genotype for these genes was present in your DNA. Your rating of either NORMAL or ABOVE AVERAGE indicates the likelihood that you will develop age spots over time.

SKIN GLYCATION

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you a NORMAL level of protection against skin glycation. That means you are less likely to notice premature skin aging as evidenced by the marked loss of skin tone in the form of sagginess and wrinkles, though everyone naturally experiences some level of skin deterioration over time.



Your genetic profile indicates that you are likely to have a NORMAL level of protection against skin glycation.

You can reduce your risk of skin deterioration and premature aging via skin glycation even further practicing healthy diet, exercise and lifestyle habits to maintain healthy skin integrity.

SUCCESS STRATEGIES

In the case of skin glycation, your skin is actually a mirror of your interior health. When it shows signs of breaking down, your organs are suffering too. So it's important for everyone—regardless of genetic risk levels—to take care to minimize the AGE (advanced glycation end products) levels in their system. Here's how:

Eat less simple sugar. AGE-related cell damage is glucose driven. So the best way to minimize your risk is to minimize how much simple sugar you eat, particularly fructose and high fructose corn syrup, which research shows increases your rate of glycation by 10 times. Choose whole grains and other complex carbohydrates, which are rich in healthy fiber and release less glucose into your system.

RELATED GENES / SNPs

AGER, GLO1

The genes and their associated SNPs included in this category have been shown in studies to have significant associations with a person's susceptibility to skin glycation—deterioration of certain proteins in skin that causes visible signs of aging such as fine lines, wrinkles, sagginess and dullness or loss of radiance.

As the name implies, skin glycation is glucose (sugar) driven. It occurs when sugar molecules in your system glom onto proteins in your skin, such as collagen and elastin (which give your skin its firm, plump, springy texture) and form what are known as advanced glycation end products (AGEs for short). AGEs cause your protein fibers to become rigid, brittle and prone to breaking down. High levels of glucose (blood sugar) may accelerate this process, but it also occurs when cells are exposed to normal blood sugar levels over time. How susceptible you are to skin glycation also depends on your genes, as some people have genetic variations that

LOOK

SKIN GLYCATION

Fill up on fruits and vegetables. Fresh produce delivers a host of skin protecting, collagen building, AGE-fighting vitamins and phytochemicals including vitamin C and anthocyanins. One of the all-star AGE fighters to be sure to include is blueberries, which are particularly potent against AGE formation.

Have daily tea time. Green tea contains a powerful antioxidant compound called epigallocatechin gallate (EGCG) that protects your skin and interferes with the glycation process.

appear to make them more susceptible to the effects of AGEs.

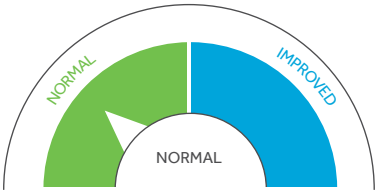
The main enzyme that protects your cells from AGEs is known as glyoxalase 1. The gene that influences that activity is GLO1. In a recent study of 326 men and women with either healthy blood sugar levels or with type 1 or type 2 diabetes, researchers found that the specific SNP variations in the GLO1 gene people carried predicted their level of protective enzyme activity, with those carrying minor alleles having lower enzyme activity—e.g., increased risk for skin glycation.

Our analysis investigated which genotype for these genes was present in your DNA. Your rating of either NORMAL or BELOW AVERAGE reflects the level of natural glycation protection you have based on your genotype.

FACIAL AGING

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you a NORMAL degree of visible skin aging. That means that your skin is likely to develop fine lines by your late 20s and show other signs of photo aging such as deeper wrinkles and thinning and sagging as you grow older. Though a certain amount of skin aging is inevitable, ultimately it is a symptom of skin damage, which can be accelerated or slowed down by sun exposure, daily nutrition and lifestyle behaviors.



Your genetic profile indicates that you are likely to have a NORMAL level of skin aging.

You can take steps starting now to minimize skin damage and maintain more youthful elasticity and smoothness as you age.

SUCCESS STRATEGIES

As you age, the collagen, elastin and the extrafibrillar matrix, which provide structural support for your skin weakens. You can prolong the health of your skin and protect against premature skin aging by protecting and taking care of your body's largest organ.

Be sun smart. On skin that gets exposed to the sun, up to 90 percent of the aging you see is due to damage caused by the sun's UV rays, which damage the skin's collagen and elastin fibers. Though most sunscreens will protect against the shallow burning UVB rays, you need a broad spectrum sunscreen to block out the deeper, more skin-damaging UVA rays. Look for a sunscreen that is at least SPF 30 and 4 star UVA protection to minimize short- and long-term skin damage. Wear extra protection such as wide brimmed hats to protect your face during peak sun hours of 10 a.m. to 3 p.m. See the advice section under Sun Sensitivity for more information.

RELATED GENES / SNPs

STXBP5L

The gene and its associated SNP included in this category have been shown in studies to have significant associations with a person's susceptibility to visible signs of facial aging.

As is the case with all of our organs, our skin, especially that on our face, ages over time. Visible signs of facial aging include wrinkling, especially around the eyes and mouth; creases or frown lines in the forehead, and thinning and sagging or folding of your skin, particularly around your eyes, mouth and jawline.

Some amount of visible facial aging is inevitable with the passage of time. However, there are certain lifestyle behaviors that accelerate and/or exacerbate it such as smoking, poor nutrition and sun damage. Genetics also plays a role, especially in the case of Caucasians.

In the first ever genome-wide association

LOOK

FACIAL AGING

Don't smoke. Add premature skin aging to the hundreds of reasons not to smoke. Smoking narrows blood vessels, which reduces healthy blood flow to the skin, depriving it of the nutrients and oxygen it needs to stay healthy; decreases collagen synthesis and dehydrates the skin.

Stay hydrated. Your skin loses elasticity when it's dehydrated. Generally speaking, women need about 9 cups of fluids and men need about 13 cups of fluid per day. You can get that from watery foods like fruits and vegetables, as well as water.

study of its kind, researchers examined more than 500 middle-aged French Caucasian women to identify the factors that may affect the severity of skin aging. They found that those who carried the A allele of this gene showed less aging, particularly skin wrinkling and sagging (age spots were not influenced by this gene), over time.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of NORMAL or IMPROVED reflects the degree to which you are likely to experience visible signs of skin aging with the passage of time.

Eat your antioxidants and essential fats. Antioxidants like vitamins C and A not only protect your skin from free radical damage, which can lead to premature aging, but also help the body produce collagen and regenerate damaged collagen fibers. You can find those in all your brightly colored fruits and vegetables like red bell peppers, blueberries, raspberries and spinach. Omega-3 fatty acids make up an important part of your skin barrier, which helps keep it hydrated and plump. Fatty fish is your best source.

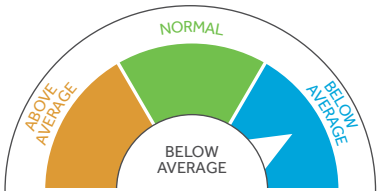
Apply lotions. Lotions help keep your skin looking supple by locking in moisture. Also consider topical lotions that include ingredients such as alpha hydroxy acids, retinols, vitamin C and peptides, which can stimulate cell turnover and collagen production.

Get your beauty sleep. There's a reason it got that nickname. Lack of sleep ages your skin, making it look sallow and lackluster. Long term, short sleep increases levels of your stress hormone cortisol, which can break down collagen.

STRETCH MARKS

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you a BELOW AVERAGE likelihood of developing stretch marks. *That means you are not prone to developing visible scarring, even during times of relatively rapid weight changes, though, of course, you are not immune.*



Your genetic profile indicates that you are likely to have a BELOW AVERAGE level of susceptibility to stretch marks.

You can reduce your risk even further during high risk times (such as pregnancy) by practicing healthy diet, exercise and lifestyle habits to maintain healthy skin elasticity.

SUCCESS STRATEGIES

Even those not prone to stretch marks can experience some of this visible scarring during extreme weight changes like pregnancy. Once they occur, they usually fade over time. You can help prevent their occurrence and minimize their appearance by practicing good skin hygiene.

Keep your skin hydrated—inside and out. If you've ever pinched your skin when you're dehydrated, you can see firsthand (literally) how dehydration makes your skin less supple and resilient. Stay properly hydrated by drinking 9 glasses of cups of fluid a day if you're a woman, and 13 cups a day if you're a man, in accordance with the recommendations of the Institute of Medicine.

If you're prone to dry skin, apply moisturizer daily to help improve the appearance and overall tone of your skin.

RELATED GENES / SNPs

ELN, SRPX, HMCN1, LOC105373353

The genes and their associated SNPs included in this category have been shown in studies to have significant associations with a person's susceptibility to developing striae distensae, commonly known as stretch marks.

Stretch marks are a form of scarring that creates indented, sometimes discolored, streaks along the skin. They are caused by a rapid stretching and subsequent tearing of the dermis. They are usually associated with pregnancy, but also can occur during puberty, and after any sudden or large weight gain, including breast enhancement surgery. Depending on your skin tone, these striations may appear pink, purple, black or red and tend to fade over time. Stretch marks are extremely common, with up to 80 percent of the population experiencing them. Women are more prone to stretch marks (likely because of pregnancy) as are people using corticosteroid medications, as these medications thin the skin and leave it more vulnerable to damage. Medical conditions

LOOK

STRETCH MARKS

Eat more "skin food." Like the rest of your body, your skin needs nourishment to help protect it from damage and promote healthy generation and repair. Follow a Mediterranean style diet, which is rich in antioxidant-heavy fruits and vegetables, nuts and seeds (which deliver skin-protecting and nourishing minerals like selenium and zinc), and lots of fatty fish for skin-regenerating omega-3 fatty acids.

Exercise regularly. Physical activity raises your heart rate and boosts your blood flow so your skin gets the oxygen and nutrients, as well as the waste removal, it needs to stay healthy. Aim for at least 150 minutes a week.

such as Cushing's syndrome (caused by prolonged exposure to cortisol), as well as adrenal gland diseases also raise your risk. There are also genetic risk factors for stretch marks.

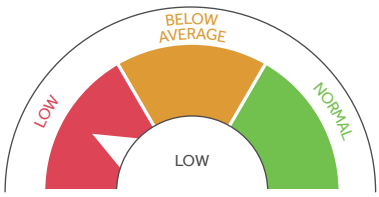
At the extreme end of the genetic spectrum are connective tissue diseases such as Marfan syndrome and congenital contractural arachnodactyly, which are caused by mutations in certain genes and lead to stretch marks as well as other symptoms. However, you don't need to have a congenital disease to be genetically predisposed to stretch marks. In one study of nearly 34,000 men and women of European descent, researchers identified four gene SNPs that are significantly associated with stretch marks.

Our analysis investigated which genotypes for these genes were present in your DNA. Your rating of ABOVE AVERAGE, NORMAL or BELOW AVERAGE reflects the degree to which you are likely to experience stretch marks.

FAT LOSS RESPONSE TO CARDIO

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits a LOW fat loss response to cardio exercise. That means, based on your genotype, you have a greater chance of showing a reduced fat loss response to doing the minimum recommended amount of 150 minutes of moderate to high intensity cardio exercise per week. That's not to say that you can't lose weight through exercise, it may just be more difficult for you than someone with a more responsive genotype. That means if weight loss is your goal, you may have to do more and work harder to see the desired results. You may also experience more weight loss by focusing on watching what you eat more carefully, as diet influences body composition more than exercise for most people regardless of genotype. Remember, too, that exercise has health benefits above and beyond fat loss.



Your genetic profile indicates that you are likely to experience LOW fat loss in response to the minimum cardio recommendations of 90 to 150 minutes a week of moderate to high intensity exercise.

If your goal is weight loss, we recommend aiming for 250 to 300 minutes a week—an amount that has been shown in studies to promote significant amounts of weight loss.

SUCCESS STRATEGIES

The general exercise recommendations to get 150 minutes of exercise per week were developed to improve cardiovascular health, but not necessarily to help with weight loss. Some people, especially those with less exercise responsive genotypes, need to boost their exercise frequency and/or intensity to see measurable body composition changes through exercise.

RELATED GENES / SNPs

ADRB2, LPL

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

The desire to lose excess fat is a common one in America, where statistics show that 69 percent of us have at least some excess fat to lose. Along with a balanced diet, regular exercise is one of the ways to lose fat and improve body composition. Though everyone can lose some fat through exercise, how easily it comes off appears to be influenced by your genes.

In one large study, researchers put sedentary men and women on a 20-week cardio program where they exercised on a bike 3 days a week, starting at a moderate intensity for 30 minute sessions and building up to slightly harder bouts lasting for 50 minutes for the last 6 weeks of the study.

All the men in the study shed fat regardless of genotype. It was a different

FAT LOSS RESPONSE TO CARDIO

Go longer. The American College of Sports medicine recommends 200 to 300 minutes per week to lose weight and keep it off. Research shows that for people trying to lose weight, exercising more than 250 minutes per week has resulted in significant weight loss. To hit the 300-minute mark, plan on 60 minute sessions 5 days a week. Signing up for a regular exercise class like Zumba, indoor cycling or other activities you enjoy can help you stick to a routine.

story for the women, however. Though all the women lost some fat, women who carried certain variations of these genes lost less fat over the course of the 5-month study than their peers who carried more 'favorable' genotypes.

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 experiencing a reduced fat loss response from a regular program of cardio exercise.

Push the pace. You can ramp up your fat burning by increasing the intensity of your exercise bouts. Try cardio interval training where you alternate very intense bursts of activity with intervals of exercise at a more moderate intensity. For example, walk for 10 minutes at an easy pace to warm up, then jog or run for 30 seconds to 2 minutes. Then return to an easy pace walk for 3 to 5 minutes and then jog or run again for 30 seconds to 2 minutes. As you get fitter, you can lengthen the high-intensity intervals and shorten the recovery intervals.

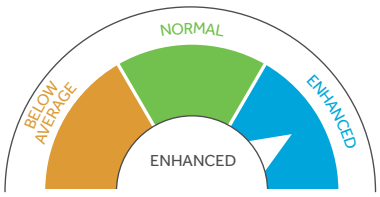
Hit the weights. Strength training helps improve body composition by helping to build and maintain lean muscle tissue, which is more metabolically active than fat tissue. High intensity resistance training sessions like kettlebell and/or boot camp style classes are great for burning a lot of calories in a short period of time so you burn more fat while you build muscle.

Eat a balanced diet. It's difficult for most people, regardless of genotype, to lose measurable amounts of fat and weight from exercise alone. If that's your goal, you will experience faster fat loss if you focus on sticking to a reduced-calorie diet, in addition to exercise.

BODY COMPOSITION RESPONSE TO STRENGTH TRAINING

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits an ENHANCED body composition response to resistance training exercise. That means that along with improving strength and building lean muscle tissue, you are likely to lose weight and lower your body fat when you engage in a regular strength training routine. That's good news because maintaining a healthy body composition not only lowers your risk for chronic disease like heart disease and diabetes, but also being stronger and lighter gives you more energy for work, play and other physical activity. And of course, a lean body composition helps you look your best too.



Your genetic profile indicates that your body composition response to strength training is ENHANCED, meaning you are more likely to both make muscle and lose fat when you strength training regularly.

You can maximize the benefits of your favorable genotype by incorporating resistance training in to your exercise routine two to three times a week.

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 have been shown to have significant associations with a person's ability to improve their body composition in response to strength training.

Body composition refers to the proportion of muscle mass you have as well as the amount of body fat you have in relation to the muscle. For good health, men should strive for a body composition that is less than 30 percent fat and women should aim for less than 25 percent fat. Maintaining a healthy body composition can help lower your chances of developing cardiovascular disease as well as diabetes and certain cancers.

Resistance, or weight, training helps you build and maintain lean muscle tissue and

SUCCESS STRATEGIES

Resistance training improves strength and the amount of muscle mass a person has. However, 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.

When you do strength train, it's important to lift weights that are heavy enough to provide your muscles with a sufficient stimulus that they are

BODY COMPOSITION RESPONSE TO STRENGTH TRAINING

pushed to build lean muscle tissue. Many new lifters, 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. Perform strength training exercises such as squats, lunges, rows and chest presses that target every major upper and lower body muscle group. Perform 2 to 3 sets of 8 to 15 repetitions of each exercise

Try new muscle challenges. 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 revs your heart rate and leads to a greater calorie burn while also working every major muscle.

Power it up. 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.

may also help reduce the percentage and sometimes amount of body fat you have. By improving your body composition, you'll be stronger to perform more physical activity of all kinds. Lean muscle tissue also contributes to a leaner appearance and, potentially, to a higher metabolism, or greater number of calories burned each day.

Numerous factors, including your predominant muscle fiber type, your hormones and the type of strength training you do influence how your body composition will respond to a resistance training program. Your genotype also plays a significant role.

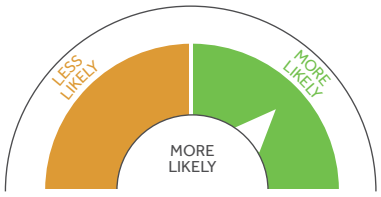
In one large study, researchers had 148 volunteers participate in an intense resistance training program for one year. They found that those who carried the most "favorable" gene variations enjoyed a full gamut of body composition benefits and not only improved their strength and muscle mass, but also experienced significant weight loss and body fat reduction. Those with less favorable genotypes still got stronger, but showed a decreased ability to lose weight and reduce body fat percentage by resistance training.

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 body composition response to resistance training exercise.

INTRINSIC MOTIVATION TO EXERCISE

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that make you MORE LIKELY to be intrinsically motivated to exercise. *That means you are more likely to derive pleasure from exercising for exercise's sake, so you are more likely to regularly engage in an exercise routine to spend more time exercising,* which of course makes it easier to reap exercise health benefits like a strong heart and to maintain a healthy weight.



Your genetic profile indicates that you are MORE LIKELY to have intrinsic motivation to exercise.

You will be more inclined to start and maintain an exercise routine without the need for external motivation or rewards. So be sure to build time into your schedule to enjoy at least 30 minutes of activity most days a week.

SUCCESS STRATEGIES

Being intrinsically motivated to exercise makes getting regular physical activity easier, but it doesn't mean you're immune to boredom or falling into a rut. These strategies will help keep exercise fresh and rewarding.

Challenge yourself. Maximize your exercise enjoyment by challenging yourself with exercise-based goals such as running a 10K or completing a triathlon. Fun fitness challenges can add fuel to your intrinsic motivation to keep moving and keep you from falling into an exercise rut.

Pay it forward. Use your exercise motivation for greater good (and be even more motivated to move) by signing up for a walk, run, or bike ride that benefits a charity of your choice. There are also apps that will donate money to your favorite charity for every step you take.

RELATED GENES / SNPs

BDNF

The gene and associated SNP included in this category have been shown to have significant associations with a person's intrinsic motivation to exercise.

Everyone needs at least 30 minutes of exercise at least five days a week for good health. People who are intrinsically motivated to exercise tend to exercise longer and more often—and reap the related health benefits—because they find exercise itself rewarding. They're the ones who hop out of bed raring to hit the gym or head out for a run because they enjoy it. People less intrinsically motivated to exercise can also enjoy exercise, but may need to find some extrinsic motivation like planning workouts with friends or rewarding themselves to maintain a consistent exercise routine.

Most of us inherently know whether or not we're intrinsically motivated to exercise. However, knowing that you're genetically more or less inclined to be intrinsically

FEEL

INTRINSIC MOTIVATION TO EXERCISE

motivated can help you establish strategies that may help ensure your success.

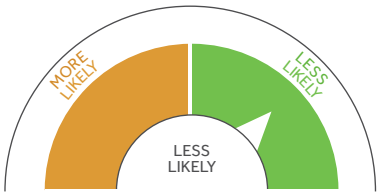
In one study, researchers collected DNA samples from a group of healthy adult men and women then observed the group while they performed a moderate 30-minute treadmill workout. After the half hour session was up, the exercisers were told that the session was complete and they could either begin a cool down or could keep going. Those with at least one copy of the 'favorable' allele were more than 2 ½ times likely to keep going than their peers with an 'unfavorable' genotype.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of either MORE LIKELY or LESS LIKELY reflects whether your genotypes included those that carried a risk for being low in intrinsic motivation or for being likely to be high in intrinsic motivation.

ADDICTIVE BEHAVIOR / STIMULUS CONTROL

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that make you LESS LIKELY to be susceptible to addictive behaviors. That means you are less likely to seek out high-reward system stimulating activities like cigarette smoking, overeating and excess alcohol use and likely have an easier time quitting those behaviors if you do.



Your genetic profile indicates that you are LESS LIKELY to have an addictive behavior personality type.

You're less susceptible to overindulging in highly stimulating behaviors like excess alcohol or drug use, overeating or to smoke. That's good news as cigarette smoking is the most common preventable cause of many diseases, including heart disease and cancer and contributes to about 6 million deaths a year world-wide.

SUCCESS STRATEGIES

Being less likely to be prone to addictive behavior can help protect you from struggles with controlling highly stimulating behaviors. Just remember that it doesn't me an you're immune from the ill effects of over-indulgence. It's still important to practice moderation.

Indulge occasionally and wisely. Even people without addictive personalities enjoy longer, healthier lives when they practice moderation with pleasant indulgences like alcohol and certain foods like chocolate that are healthful in limited doses, such as a drink a day and/or an ounce or two of chocolate a day, but can be harmful in excess.

Refrain from smoking. As rates of daily smokers have declined during the past few decades, rates of "social smokers," or those who don't identify as "smokers" but who light up occasionally has risen. Even if you're not hooked, now and then smoking contributes to a host of chronic and often

RELATED GENES / SNPs

DRD2

The gene and its associated SNP that are included in this category have been shown to have significant associations with a person's likelihood to be susceptible to addictive behaviors.

The brain's reward pathways control an individual's response to natural rewards such as food, social interactions and sexual activity. It triggers the release of feel good chemicals to reward us for certain behaviors (many of which like eating and sexual activity keep us alive and reproducing) so we keep doing them. This system plays a crucial role in the susceptibility of addictive behaviors such as starting and continuing to smoke as well as excess alcohol consumption, drug use and overeating, and may explain why quitting these behaviors proves far more difficult for certain individuals than others.

Variations of these genes are significantly associated with addictive personality behaviors such as cigarette smoking. One meta-analysis of 22 studies including

FEEL

ADDICTIVE BEHAVIOR / STIMULUS CONTROL

fatal health conditions, including heart disease, respiratory tract infections, cancer (particularly lung cancer) and slower recovery from injuries, as well as generally poorer health. Your present and future health can improve dramatically when you cease smoking completely.

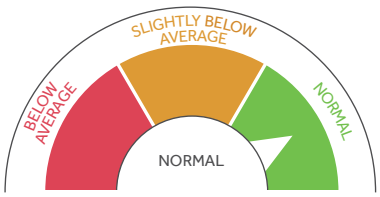
11,075 men and women consistently showed that people carrying A2/A2 genotype are more likely to quit smoking than those carrying A1/A1 or A1/A2, who were less likely to quit. Taq1A genotypes were also more likely to quit smoking.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of either MORE LIKELY or LESS LIKELY reflects whether your genotypes included those that carried a risk for being more or less likely to have an “addictive personality” type.

IMPULSE CONTROL & TASTE PREFERENCE

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you an NORMAL level of impulse control and risk for consuming high calorie foods as you age. That means that though you still need to be mindful of what and when and how much you're eating, you are not at an increased risk for increased impulsivity, particularly around rich, tempting foods.



Your genetic profile indicates that you will likely have a NORMAL level of impulse control and risk of consuming excess high calorie foods as you age.

You'll be even less likely to succumb to the lure of high fat sweets and snacks and to eat impulsively by following some simple mindful eating strategies.

SUCCESS STRATEGIES

Even people with good impulse control can slip into mindless eating, especially in social situations where Cornell University Food and Brand Lab research finds pretty much everyone eats about 44 to 76 percent more than they would alone. Likewise, nearly all of us have certain foods we find impossible to resist. We recommend that everyone employ a few healthful, mindful eating strategies.

Snack first; then stand clear of the food. Since social situations are when nearly everyone eats (and overeats) impulsively, set yourself up for success by having a light, but fiber-rich and filling snack like an apple and natural peanut butter before you leave the house. It'll be far easier to resist picking at all the finger foods at the party or event. Also, position yourself away from the food

RELATED GENES / SNPs

FTO

The gene and associated SNPs included in this category have been shown to have significant associations with a person's impulsivity and taste preference for fatty foods as they age.

Impulse control, especially in the presence of an abundance of calorie-dense, fatty foods is essential for maintaining a healthy, portion-controlled diet. So called "mindless" eating or eating just because its there, is a common problem in our society where food is present everywhere you turn. Even small things, such as the size of the food container and being around others can lure you into impulse eating. Fatty rich foods are also easy to overeat once you start eating them because they stimulate powerful pleasure centers in your brain.

While some people are aware of their impulsivity, many people eat and overeat impulsively without being aware of it, especially in social situations, when eating

IMPULSE CONTROL & TASTE PREFERENCE

table, so you won't mindlessly nibble while you socialize.

Stash it out of sight. Store treats, sweets and high calorie snacks in the least convenient space in your kitchen cupboards. It's harder to impulsively eat when food is out of sight. If you know there's a certain food, like BBQ potato chips, that you cannot resist, don't keep them in the house. Enjoy them as an occasional treat when you go out, instead. Ditto for candy jars. In one study people who kept candy in sight (and arm's reach) weighed about 15 pounds more than those who didn't.

Avoid distracted eating. People who eat while watching TV consume 28 percent more food, according to a study out of the Cornell University Food and Brand Lab. Focus on your food to be aware of what and how much you're eating. You'll enjoy it more, too.

Portion it out. If you want a snack or sweet, dish out a portion and put the rest away. Eating straight from the box, bag or container makes it challenging to not over-indulge, even for people with high impulse control. Research shows people eating out of large containers eat more than 50 percent more than those eating the same snacks in reasonably sized containers.

Keep healthy foods on hand. Keep plenty of baby carrots, pepper strips, apples, clementines, and other healthy snacks in sight and easily accessible when you feel like reaching for some food.

out and when food is readily available, like during meetings or other functions where cookies and pastries are out for the taking. Though we tend to think of resisting impulsive eating as an act of "willpower," it takes a good deal of mindfulness to avoid slipping into impulse eating behavior and there also appears to be a genetic component underlying some of this behavior.

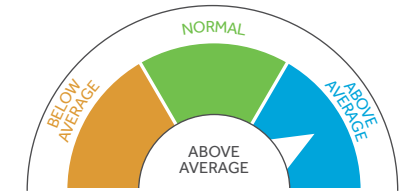
Results from the Baltimore Longitudinal Study of Aging (BLSA) indicate that people who carry a risk allele of the FTO gene are not only at a 67% higher risk for becoming obese, but also for having reduced activity in the region of the brain that dictates impulse control and taste preference, leaving them more susceptible to consume—and overeat—high calorie, fatty foods, which of course is likely an underlying factor behind their being overweight.

Our analysis investigated which genotype was present in your DNA. Your rating of NORMAL, SLIGHTLY BELOW AVERAGE, or BELOW AVERAGE indicates your level of impulse control and your relative risk for consuming high calorie foods as you age.

SLEEP DURATION

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that make you likely to get an ABOVE AVERAGE amount of sleep per night. That's generally good news because adequate sleep protects your health and improves your mood and general daytime functioning. It's important to keep in mind, however, that the majority of factors that influence sleep duration are not genetic. So even if you have a genetic predisposition for above average sleep, you must still practice good sleep hygiene to ensure that you get sufficient rest and reap the many health benefits associated with regularly getting a good night's sleep. Also be mindful that excessive amounts of sleep (more than 9 or 10 hours) are associated with health risks such as obesity, heart disease, and diabetes and may be a symptom of an underlying condition such as depression. If you are a long duration sleeper, talk to your doctor.



Your genetic profile indicates that you may be likely to get an ABOVE AVERAGE amount of sleep per night.

Since the average American sleeps just 6.8 hours of sleep a night, that's good news. Because many lifestyle, diet, and behavior factors impact your sleep duration, you'll be more likely to maximize your genetic potential and to consistently get the recommended 7 to 8 hours of restorative sleep each night if you implement habits that are conducive to good sleep.

SUCCESS STRATEGIES

Sleep has a powerful effect on health. It's a big check in the plus column that you are genetically inclined to get above the average amount of sleep per night. Remember, however, many factors impact quality sleep and your genes don't make you immune to sleep disrupting lifestyle factors. You still need to practice good sleep habits to ensure you get the proper amount of restorative sleep you need.

RELATED GENES / SNPs

ABCC9, LOC101927400, DRD2

The genes and their associated SNPs that are included in this category have been shown to have significant associations with sleep duration.

Sleep is essential for physical and psychological health. Research shows that sleep plays a critical role in immunity, metabolism, learning, memory and a host of vital functions. Getting too little sleep (6 hours or less) doesn't just make you feel drowsy and irritable during the day, but also has been linked with an increased risk for heart disease, diabetes, poor cognitive function, getting sick and weight gain. Research shows that adults sleeping 5 or fewer hours a night have 55% greater odds of becoming obese.

Research also shows that Americans currently average 6.8 hours of sleep a night, with 26 percent averaging 6 hours or less and 14 percent averaging 5 hours or less. Many factors, including age, gender, lifestyle, diet, caffeine and alcohol consumption, occupation, light exposure and general health influence how much (or

FEEL

SLEEP DURATION

Easy on the late day lattes. Caffeine has many mental and physical performance benefits. It's easy to overdo, however, especially late in the day. Caffeine works by binding to your brain's nerve receptors, speeding them up, which triggers your pituitary glands to secrete adrenaline. Hence the energy buzz. The half-life of caffeine is about six hours, so if your last mug is at 4 p.m., by 10 p.m., you still have a shot of espresso's worth flowing through your system, which research shows can reduce your sleep by an hour. Have your last cup before 4, so you can wind down and fall asleep more easily.

Avoid alcohol close to bedtime. Alcohol within an hour of bedtime lengthens your non-REM sleep and shortens your REM sleep during the first half of the night, so you are in more wakeful territory longer. As your liver clears the ethanol from your bloodstream, your body can go into a bit of withdrawal during the second half of the night, making you restless and more likely to toss and turn. Stick to one or two drinks and avoid alcohol an hour or two before bedtime.

Dim the lights—and electronics. Too much light exposure late in the evening suppresses your melatonin—a hormone produced in the pineal gland of the brain that is critical for your natural sleep-wake cycle—so your body temperature doesn't dip and your body doesn't get the signals that it is time to start the stages of sleep. That includes your smartphone or tablet, which also emit blue wavelength light, which has been shown to be especially harmful to circadian rhythm function. Dim the lights and shut down all electronics 30 minutes before you want to be asleep. Also consider downloading a blue light-filtering app if you must be on your device at night.

Set the stage for sleep. Humans sleep best in cool, dark, quiet conditions. Set your thermostat to between 60 and 67 degrees for the optimum ambient sleeping temperature. Consider blackout curtains if outside light enters your bedroom. Earplugs or white noise machines can block out disruptive noise.

little) sleep we get each night. Your genes may also play a role in sleep duration.

Studies show the inheritability of sleep duration to be anywhere between 9 and 44 percent. Variations in the genes, or *alleles*, listed above have been shown to influence sleep duration, with each allele increasing or decreasing sleep by 3 to 4 minutes. Compared to other factors, genes may not move the needle on sleep in a giant way, but even small amounts of additional sleep if you are typically a short sleeper can improve your well-being. Consider that research shows just a 10-minute nap is sufficient for significantly improving alertness and cognitive performance for more than two hours, and just three minutes of stage 2 sleep (the stage where we drift off and become less aware of our surroundings) has recuperative benefits and you'll appreciate how key every minute of sleep is to your well-being.

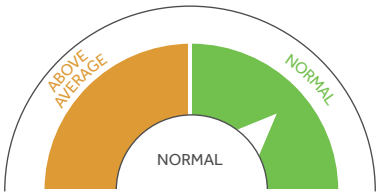
Trending your sleep duration in a healthy direction may also set the stage for improved sleep hygiene and better sleep duration long term, which may trigger a cascade of further genetic outcomes. One British study reported that there are approximately 500 genes that are affected by sleep duration. When volunteers who typically slept 7 ½ hours shaved an hour off their nightly rest, the genes associated with inflammation, immune response, stress, diabetes and risk of cancer became more active. The opposite occurred when the volunteers who typically slept 6 ½ hours added an hour of sleep.

Our analysis investigated which genotype of each of these 5 genes was present in your DNA. Your rating of NORMAL, BELOW AVERAGE, or ABOVE AVERAGE reflects whether your genotypes include those that carried a risk of reduced healthy sleep duration.

SUGAR INTAKE

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that make you likely to consume an NORMAL amount of sugar. That means you may be less likely to crave and overeat sugary foods. That's the good news. The bad news, is that nearly all of us, regardless of genetic predisposition, are eating too much sugar, often without realizing it, as our food supply—literally from soup to nuts—is loaded with hidden sugars. Sugar also is very easy to overeat once you start, as it triggers the same cascade of feel-good brain chemicals like serotonin and dopamine as cocaine. Smart sugar strategies are important for everyone to employ.



Your genetic profile indicates you are likely to consume a NORMAL amount of sugar.

You'll consume even healthier amounts—and avoid the negative health consequences related to eating too much sugar—by raising your awareness of what foods contain added sugar and how much you presently consume, so you can choose better alternatives.

SUCCESS STRATEGIES

Even people who aren't genetically inclined to seek out sugar often eat far too much sugar—in many cases twice the recommended daily maximum amount—without even realizing it. We recommend that everyone practice sugar savvy habits.

Omit the obvious offenders. Soda, juices (without the fiber of the whole fruit, it's pure sugar) and sweetened beverages are the main sources of sugar in many people's diets. One 12 oz. can of cola alone contains 39 grams. Opt for water with a squeeze of lemon.

Scan the ingredients. It's not enough to check the labels for sugar, because foods like tomato sauces, dairy products and yogurt contain natural sugars,

RELATED GENES / SNPs

SLC2A2, GLUT2

The gene and associated SNPs included in this category have been shown to have significant associations with a person's daily sugar intake, which in excess can have profound negative health consequences, including increasing the risk for weight gain (and obesity), diabetes, and heart disease.

Dietary sugar—especially the added, nutritionally empty kind found in sodas, sweets, dressings, cereals, condiments and processed foods – is a major public health problem. U.S. Departments of Agriculture and Health and Human Services currently urge eating less than 10 percent of your calories from *added* (not naturally occurring sugar found in whole food) sugar. That's about 49 grams, or 12 to 13 teaspoons (there are 4 grams of sugar in every teaspoon/cube and 4 calories per gram/16 calories per teaspoon) for a 2,000-calorie a day

SUGAR INTAKE

which are okay. Read the ingredients and check for added sugars including beet sugar, brown sugar, cane sugar, corn sugar, corn sweetener, corn syrup, fruit juice concentrates or purees, high-fructose corn syrup, honey, malt sugar, molasses, raw sugar, syrup, maple syrup and, of course, sugar. Also be on the lookout for sugar molecules ending in "-ose" - things like dextrose, fructose, glucose, lactose, maltose and sucrose. If those ingredients are in the top 3 on the list, that's too much.

Beware low-fat. Many low-fat products are high in added sugar, as that's what their manufacturers use to boost the flavor once the fat is gone.

Eat natural sweets. Carrots, corn, apples and berries are all naturally sweet and good for you. Snacking on naturally sweet produce can satisfy a craving for sweetness without all the added sugars. Fruits (especially berries, cherries, green apples and plumbs) and vegetables are also high in fiber, which slows the stream of sugar into your bloodstream.

Skip the artificial sweeteners. It may seem logical to replace your sugar-sweetened soft drinks with diet varieties, but artificial sweeteners have been linked to weight gain, glucose intolerance and increases in health harming visceral belly fat. Recent research suggests that artificial sweeteners not only don't trip the neurons in your brain that tell you that you've eaten, but also may disrupt healthy gut bacteria that promotes healthy insulin response and energy storage.

diet. Americans today far exceed that amount, consuming about 88 grams or 22 teaspoons a day of added sugars. The World Health Organization recommends slicing your intake to half that much, sticking to just 5 percent of your daily intake, or 25 grams a day.

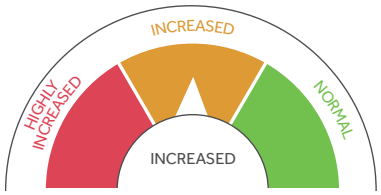
Because added sugar is found in so many surprising places, even the most health conscious people may consume much more than they realize or intend. So we all need to make a concerted effort to read labels and keep our intake in check. What's more, there appears to be a genetic component to the body's ability to sense how much sugar we are taking in and to regulate our food intake accordingly. One study found of more than 680 men and women—including both young, healthy adults and those who were overweight with early Type 2 diabetes—found that men and women who were carriers of the 'unfavorable' allele consistently consumed about 20 grams more sugar each day, mostly from baked goods, chocolate and sweetened beverages, compared with those with the 'favorable' genotype.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of either NORMAL or ABOVE AVERAGE reflects whether or not your genotypes included those that carried a risk for habitual consumption of an excess amount of sugar.

AGE RELATED HEARING LOSS

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you INCREASED risk for age-related hearing loss. That means your hereditary risk for hearing loss is higher than normal. That doesn't mean you are fated to lose your hearing, of course. One third of permanent hearing damage is preventable. It's just especially important that you be vigilant about protecting your ear health to maintain your hearing and minimize loss throughout your lifespan.



Your genetic profile indicates that you have an INCREASED risk for age-related hearing loss.

We recommend that you take extra precautions to protect your ears, maintain good general health and avoid damage and health conditions that can contribute to hearing loss over time.

SUCCESS STRATEGIES

Everyone, regardless of genetic makeup, is at some risk for hearing decline over time. As someone with increased risk, protecting your hearing and ear health is particularly important.

Turn it down. There's more noise in our everyday life than we're often aware of. Everyday appliances like hair dryers, blenders, and coffee grinders all send out uncomfortable decibel levels. As a rule of thumb, if something is noisy enough to be uncomfortable, it's noisy enough to damage your hearing. Turn the hair dryer on medium or low; wrap a dishtowel around the base of blenders and coffee grinders to muffle the noise.

Wear hearing protection. Protect your ears when you know they'll be exposed to particularly loud sounds and/or environments, such as when you're mowing the lawn, blowing leaves, using heavy machinery, attending a loud music venue, hanging around loud motor vehicles and so forth. Earplugs or

RELATED GENES / SNPs

GRM7

The gene and its associated SNPs that are included in this category have all been shown to have significant associations with a person's risk for developing age-related hearing loss.

Hearing loss is the most prevalent sensory impairment as we get older. About 20 percent of Americans report some degree of hearing loss, and by age 65 one in three of us has at least some trouble with our hearing. Hearing loss can be isolating since we use this sense as one of our primary forms of conversation.

Age-related hearing loss happens as the tiny hair cells in your inner ears slowly break down and can't pick up sound vibrations as well as they used to. The loss of these cells often happens with aging itself, but there are numerous contributing factors such as exposure to loud noise, health conditions like heart disease and diabetes, certain antibiotics and other medications and heredity.

AGE RELATED HEARING LOSS

earmuffs can reduce noise by a hearing protecting 30 decibels.

Minimize earbud time. Wearing earbuds can place your ears at a higher risk for damage because the sound is going directly into your ears without dissipating in the air. Headphones max volume is around 105 decibels. Normal talking is between 50 and 60 decibels. Ear health experts recommend keeping the volume on your player to 60 percent of max—the level of someone talking loudly—and limit it to about 60 minutes a day.

Manage diseases related to hearing loss. Diabetes, high blood pressure and heart disease can increase your risk for suffering hearing loss because they affect the blood supply to your ears. Control your blood pressure and manage your insulin to help maintain healthy ear function.

Get your hearing checked. Hearing loss happens so gradually many people don't realize it's happening until they've suffered significant loss. Get your hearing tested as part of your annual physical.

We've long known that people who have family members with hearing loss are more likely to have hearing loss themselves as they age. A recent study of 3,434 men and women from six different countries identified people with certain gene variations (specifically those carrying the T allele, which was associated with 2.5 times higher risk) as having a much greater risk for age-related hearing loss. Other variations were connected to even greater risk for hearing loss over time, though the age of onset, the rate of decline and the type of hearing loss they experience—e.g. whether it's mostly certain pitches or tones or trouble with word recognition—varies from person to person.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of NORMAL, INCREASED or HIGHLY INCREASED reflects whether or not your genotype includes those that put you at a higher risk for age-related hearing loss.

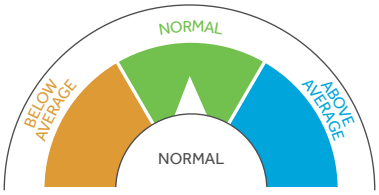
Check your meds. A long list of medications including antibiotics and high doses of aspirin can harm your ears and lead to hearing loss. Talk to your doctor about hearing damage concerns when receiving any prescriptions so you can work to find an alternative drug or take other measures to minimize potential damage.

Heed warning signs. Be aware and see your doctor if you notice any changes in your hearing, including ringing in your ears, trouble hearing conversations, can't hear high-pitched sounds and/or have difficult hearing over the phone.

LONGEVITY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you a NORMAL likelihood of extreme longevity. That means you may be more likely to live into your 90s and 100s. It's important to remember, however, that genes are only one of many factors that contribute to a long lifespan. Your lifestyle, diet, exercise habits and other behaviors have been shown in numerous studies to have a major impact on lifespan and longevity.



Your genetic profile indicates that you have a NORMAL likelihood of extreme longevity.

You can make the most of your advantageous genetic profile by adopting healthy lifestyle behaviors that will help you avoid the common chronic diseases that can shorten your lifespan regardless of genetic profile.

SUCCESS STRATEGIES

"Good genes" contribute to longevity, but lifestyle plays a major role. You still need to take care of your health and practice lifestyle, diet and exercise behaviors that will maximize your genetic potential.

Eat well & exercise. Exercising two to four times a week increases the likelihood you will live to 90, regardless of your genes. Likewise, it is important to maintain a healthy weight, which means complementing regular physical activity with a balanced diet.

Watch your "sugars." Blood sugar and insulin sensitivity appear to be inexorably linked to longevity. The FOXO gene is a key component of the insulin pathway, as well as human longevity. Research shows that long-lived men exhibit several biological markers that indicate greater insulin sensitivity along with a favorable FOXO3A GG genotype. Other studies suggest that

RELATED GENES / SNPs

FOXO3, APOC1 (APOE-CI-CII)

The genes and their associated SNPs that are included in this category have been shown to have significant associations with a person's likelihood of extreme longevity—living into one's 90s or 100s.

To live a long, healthy life is a very common human goal. Life expectancy from birth hovers in the mid- to late-70s for men and the early to mid-80s for women around the world. For those who reach age 65, life expectancy is above average. For decades, scientists have studied human lifespan and why some people live 100 years and beyond while others fall short. The answers are, of course, complex and multifactorial, including geography, culture, lifestyle and much more.

Genetics are also known to play a key role, especially in our later years. The genetic contribution to longevity in humans overall

FUNCTION

LONGEVITY

consuming high amounts of sugar and the subsequent insulin response "turns off" genes associated with longevity. Having diabetes resulted in an 86 percent increase in the risk of dying before 90 in a study published in the Archives of Internal Medicine study.

Eliminate processed, white flour, high sugar foods from your diet as much as possible. Instead eat a balanced, high fiber, primarily plant food diet that is known to help maintain healthy blood sugar levels.

Keep your heart healthy. High blood pressure is a major health risk and can shorten your lifespan. Know your numbers and maintain a healthy blood pressure level of 120/80.

Don't smoke. Nobody has to tell you that. But don't.

has been widely estimated to be about 25 percent. The older you get, the more genes come into play. Scientists now know that genetic factors have an increasing impact, particularly after 60 and profoundly from age 85 onwards.

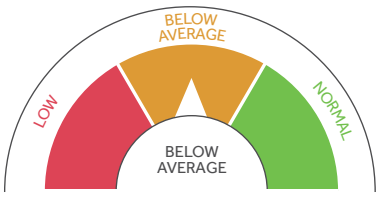
A growing body of research on thousands of the "oldest of the old," those in their 90s and 100s, show that these two genes and their alleles are strongly associated with one's likelihood for extreme longevity, while other gene mutations appear to reduce that likelihood by up to 50 percent. Interestingly, previous research has shown that long-lived families carry as many genetic mutations that put them at risk for disease as the general population. These other gene variants just appear to promote healthy aging and protect them from disease.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of BELOW AVERAGE, NORMAL or ABOVE AVERAGE reflects whether or not your genotype included that those increase your likelihood to live into your 90s or 100s.

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. That means you may experience fewer gains from high intensity workouts as someone with a more favorable genotype. That doesn't mean you can't benefit from exercise, however. You can still improve your fitness and reap the many health gains from aerobic exercise. 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.



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

Though your genotype might limit your fitness improvements in response to high-intensity exercise, you can still improve your fitness by performing longer, moderate intensity workouts.

SUCCESS STRATEGIES

The good news is that even if your genotype doesn't respond optimally to high intensity workouts, you can still get fit and see results through an exercise routine that includes longer endurance workouts.

Perform moderate-intensity cardio workouts such as brisk walking, jogging, cycling, swimming or exercise classes 4 or more days per week. If you're just starting out, begin with 20 to 30 minute sessions and increase the duration by 5 or 10 minutes each week until you are up to 60 to 90 minutes. You may want to consider training for an endurance event like a charity bike ride or a 10K, half-marathon or even an Olympic distance triathlon.

Also consider an endurance-based resistance training program like circuit

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 cardiovascular fitness response to moderate-to-high intensity exercise.

Exercise has innumerable health benefits, including preventing chronic diseases like diabetes and heart disease that hinder how well your body functions and your quality of life. It also makes you "fit," which means your body is more efficient at using oxygen, so you can push yourself harder running up steps, slamming tennis serves and playing with kids without feeling fatigued. Being able to handle more exercise also means burning more calories to manage your weight.

The hallmark of how fit you are is called your VO2 Max, which is a measure of your oxygen capacity—how much oxygen-rich blood your heart can pump and how much your muscles can use per minute. The

FITNESS RESPONSE TO CARDIO

training, where you move from one strength training exercise to the next with no rest between exercises.

fitter you become, the more your ability to take in more oxygen improves, the harder and longer you can exercise without getting tired.

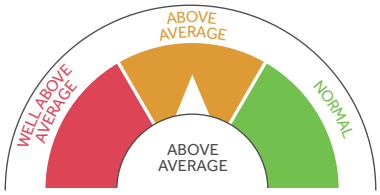
In general, your VO2 Max improves with moderate to high intensity exercise. How much it improves depends on many factors including your size, gender and as scientists now know, your genes. When researchers had sedentary men and women begin an exercise routine that included up to 50 minutes of cardio machines like spin bikes and treadmills 3 to 4 days a week for 5 to 6 months, those with an 'unfavorable' genotype experienced smaller gains in their cardiovascular fitness from the training. They also were less able to perform high intensity efforts, suggesting that 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 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.

SYSTEMIC INFLAMMATION

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you a likelihood of having ABOVE AVERAGE systemic inflammation levels. That means your C-reactive protein (CRP) levels are likely to fall in a slightly elevated range. Persistently elevated systemic inflammation can lead to age-related chronic diseases like diabetes and heart disease, so it's important to keep inflammation in check. The good news is that genes are only one factor that influence CRP levels. Healthy diet and lifestyle behaviors can help significantly reduce inflammation.



Your genetic profile indicates that you are inclined to have ABOVE AVERAGE systemic inflammation levels.

You can lower your CRP levels and avoid inflammation-related chronic diseases by practicing healthy diet, exercise and lifestyle behaviors.

SUCCESS STRATEGIES

Since your screening results indicate that you're genetically inclined to have slightly elevated systemic inflammation, ask your doctor about having your CRP levels screened along with your cholesterol, triglycerides and other blood markers. A high-sensitivity C-reactive protein (hs-CRP) test is more sensitive than the standard test and also can be used to evaluate your risk for developing coronary artery disease.

Along with getting screened, practice "anti-inflammatory" lifestyle behaviors including:

Achieve and maintain a healthy weight and body composition. Body mass index (BMI) and body fat measurement are both ways to determine your body composition, and body composition is the main non-genetic determining

RELATED GENES / SNPs

CRP, APOC1 (APOE-CI-CII), HNF1A

The genes and their associated SNPs that are included in this category have been shown to have significant associations with a person's systemic inflammation levels.

We've all experienced inflammation from bee stings, rolled ankles and/or bumps and bruises. That's acute inflammation that swells up, does its healing work and goes away. We also experience inflammation we don't see—low-level internal inflammation, which if unchecked can damage our blood vessels and lead to many serious chronic diseases like heart disease, diabetes, stroke, some neurodegenerative diseases like Alzheimer's and some forms of cancer.

C-reactive protein (CRP) is a protein found in your blood plasma that binds to the surface of dead or dying cells and certain bacteria to clear them from your body. When there's a lot of cellular damage to clean up, CRP levels rise. Doctors use CRP

SYSTEMIC INFLAMMATION

factor for CRP levels. Carrying excess fat, particularly around the midsection where it is most metabolically active, is known to induce chronic low-grade inflammation. It also can switch on your at-risk genes that are associated with systemic inflammation. Maintaining a healthy weight is one of the best ways to keep systemic inflammation in check. If you're overweight, even modest weight loss can have a significant positive impact on CRP levels. In one study, overweight post-menopausal women who lost at least 5 percent of their body weight had measurable reductions in CRP levels. Those who lost weight by dieting and exercising were able to reduce their CRP levels by more than 41 percent in a year.

Get at least 2 ½ hours of exercise a week. Exercise is a powerful anti-inflammatory for your body. Research finds that getting the minimum recommended 2 ½ hours of moderate exercise a week helps lower CRP levels. In a 10-year study of nearly 4,300 men and women, those who met those exercise requirements had significantly lower CRP levels than those who didn't and people who started exercising during the study to meet those levels had lower inflammation levels by the end. Other studies show that regular exercise can reduce inflammation by up to 60 percent.

Follow a Mediterranean style diet. Studies show that eating a Mediterranean style diet, which is naturally high in monounsaturated fats as well as polyunsaturated omega-3 fatty acids, may help reduce systemic inflammation. Build your diet around fruits, vegetables, whole grains, seeds and nuts. Eat fatty fish at least twice a week. Choose lean protein foods, minimizing your intake of red meat.

Sugary foods, refined foods, and foods that are made with white flour create inflammation in the body. Limit your intake of processed foods, sweets and other low-fiber snack foods like chips and crackers, which tend to be high on the glycemic index, spike blood sugar levels quickly and lead to inflammation. One study found that overweight adults who stuck to a low-glycemic food diet were able to lower their CRP levels by 48 percent over a two-year period.

levels as a general marker of systemic inflammation. Unsurprisingly, high CRP levels have been linked to a higher risk of mortality.

There are many culprits behind systemic inflammation. Barring autoimmune disease like rheumatoid arthritis, chronic inflammation can be the result of a sedentary lifestyle, being overweight (especially if you carry your excess fat in your abdomen, where it is most metabolically active), poor fitness, a diet that is high in sugar and other inflammatory foods, sleep deprivation, as well as exposure to secondhand smoke and other pollutants.

CRP is also significantly influenced by genetics. Researchers estimate that the heritability of CRP levels is up to 40 percent. In a recent genome-wide association analysis of more than 82,700 men and women, scientists identified a half a dozen genetic variations that were significantly associated with CRP levels. When they ranked the study participants according to their at-risk CRP genetic makeup, those in the highest gene score group had an average CRP level that was more than double the average level of those in the lowest gene score group.

Though this particular study did not show an association between these gene variations and cardiovascular disease, there's a strong link between chronically elevated CRP levels and heart disease. According to data from the Physicians Health Study of nearly 15,000 healthy adult men, a high level of CRP was associated with a heart attack risk three times higher than average.

Normal CRP levels vary from laboratory to laboratory, but generally there is no or very low levels of CRP detectable in

SYSTEMIC INFLAMMATION

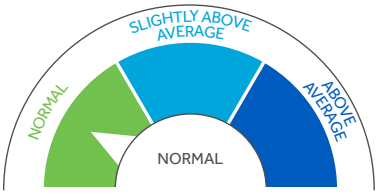
the blood. According to the American Heart Association, you are at a low risk for developing heart disease if your CRP levels are less than 1.0 mg/L; your risk is considered average if your levels are between 1.0 mg/L and 3.0 mg/L, and your risk is high if your levels are higher than 3.0mg/L.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of NORMAL, ABOVE AVERAGE or WELL ABOVE AVERAGE reflects whether or not your genotype include those that increase your risk for elevated systemic inflammation levels.

POLYUNSATURATED FATTY ACID TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you the likelihood of having NORMAL PUFA blood levels. That's okay news, but may not be great news. Blood levels of PUFA vary by geography and dietary habits. The average PUFA levels among Japanese people living in Japan where fish is a daily staple of the diet, for instance, are quite higher than the average American consuming the average American diet. Also, your genes may make you somewhat less efficient at converting and metabolizing the fatty acids you need. So even if your levels are average, there is likely room for improvement to increase circulating levels of these protective essential fatty acids.



Your genetic profile indicates that you are likely to have NORMAL blood levels of PUFAs.

We recommend swapping some of the saturated fat and/or simple carbohydrate rich foods with those rich in unsaturated fats to raise your PUFA levels, lower cholesterol and reduce your risk for coronary artery and heart disease.

SUCCESS STRATEGIES

A recent study published in the British Medical Journal found that a close adherence to Japanese dietary guidelines is associated with a lower risk of death from all causes, particularly heart disease and stroke. The men and women who followed it most closely had a 15% lower mortality rate over the span of the 15-year study. That's not surprising when you consider that the recommended Japanese diet is rich in fish, soy and vegetables, all of which are good sources of PUFAs.

The American Heart Association, along with PUFA research, supports a diet that gets about 5 to 10 percent of its energy from PUFAs like linoleic acid (LA) to reduce cardiovascular disease risk. You can increase your intake of PUFAs

RELATED GENES / SNPs

FADS1-2

The gene and its associated SNP that is included in this category has been shown in studies to have significant associations with a person's blood levels of polyunsaturated fatty acids (PUFAs).

Your body needs a certain amount of fat to perform all of its vital biological functions including produce certain hormones, absorb fat-soluble nutrients like vitamins A, D, E and K, and maintain your body temperature. Though your body is very good at storing fat, there are essential fatty acids, such as PUFAs, that need to be eaten in your diet to maintain healthy levels.

Polyunsaturated fats include omega-3 fatty acids and omega-6 fatty acids, are found in plants like nuts, seeds, and vegetable oils and seafood, and

FUNCTION

POLYUNSATURATED FATTY ACID TENDENCY

by eating more nuts (just 7 shelled walnuts provide 11 grams of linoleic acid), seeds and fish. Instead of using butter and cream as your primary source of dietary fat, try olive, canola or walnut oil. Go meatless one or two days a week and substitute soybeans and/or tofu for animal sources of protein.

Take note, it's still important for your health to minimize your intake of processed foods, even those that are made with or cooked in vegetable oils. Those oils may be healthy when drizzled over your steamed vegetables, but they don't stand up to processing and can oxidize in ways that make them harmful rather than healthful.

are generally considered heart healthy. Research shows a strong association between the levels of PUFAs in the blood and the status of a person's health. In a 16-year analysis of 2,700 older men and women, those with the highest omega-3 PUFA levels had a mortality rate 27 percent lower than those with the lowest levels. After age 65, those with the highest levels lived an average of 2.2 years longer than those with the lowest.

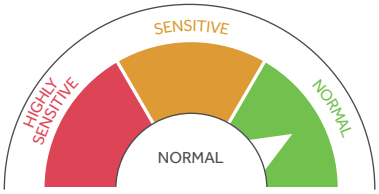
The level of these essential PUFAs in your bloodstream is largely determined by what you eat because your body cannot make its own. There is also some genetic influence to blood PUFA levels. Large scale meta-analysis gene studies have found a strong link between variations of the FADS1-2 genes and concentrations of PUFAs, particularly omega-3 fatty acid alpha-linolenic acid (ALA) and omega-6 fatty acid linoleic acid (LA), both of which have been linked to lower cholesterol levels and reduced risk for coronary artery and heart disease.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of NORMAL, SLIGHTLY ABOVE AVERAGE or ABOVE AVERAGE reflects the level of circulating PUFAs that are likely to be present in your blood.

CHOLESTEROL RESPONSE TO DIETARY FAT

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you a NORMAL blood lipid response to eating dietary fat. That means you may be less inclined to see significant changes in your cholesterol levels in response to a moderate or higher fat diet, which is in keeping with landmark studies, such as the Nurse's Health Study and the Health Professionals Follow Up Study, which found no link between overall percentage of calories from fat and heart disease. That said, not all fats are created equal, and it's still wise to choose the healthiest types and minimize those that research shows may have negative health effects.



Your genetic profile indicates that you have a NORMAL cholesterol response to eating dietary fat.

You can maximize the health benefits from the fats you eat by focusing on eating beneficial good fats and avoiding or minimizing harmful fats.

SUCCESS STRATEGIES

Research indicates that people with higher blood levels of PUFAs tend to live longer, healthier lives, especially with regard to heart disease, than those with the lowest. The American Heart Association, along with PUFA research, supports a diet that gets about 5 to 10 percent of its energy from PUFAs like linoleic acid (LA), one of the PUFAs that your genotype shows you are inclined to have higher than average levels of in your bloodstream.

You can maximize your favorable genetic profile and maintain high levels of these protective essential fatty acids by taking cues from the Mediterranean and Japanese diets—both of which are high in PUFAs and linked to longevity and good heart health—and include more fish, nuts, seeds, olive and plant oils, vegetables and soy foods in your diet while eating fewer meals based around meat and simple carbohydrates.

RELATED GENES / SNPs

LIPC

The gene and associated SNPs included in this category have been shown to have significant associations with a person's cholesterol response to eating dietary fat.

Little in the nutrition landscape has been as rife with controversy and confusion as dietary fat. For decades the brightest brains in medical science have debated, studied and scrutinized the impact the fat we eat has on our health, specifically our cholesterol levels and subsequent cardiovascular health. The results are mixed and consensus is very hard to come by. It's possible that the situation is so confounded because individual responses are just that, individual. A growing body of gene research indicates that variations in your genetic code may impact how your body responds to a host of dietary factors, including fat.

FUNCTION

CHOLESTEROL RESPONSE TO DIETARY FAT

Even though some processed foods are made with PUFA-rich vegetable oils, they still aren't healthy and you should continue to avoid them. PUFAs can be oxidized during processing, which may make them more harmful than healthful.

In one study, researchers measured the total cholesterol, triglycerides, LDL cholesterol, HDL cholesterol levels, and genotype of 743 overweight men and women and then asked them to eat either a high fat (40 percent of daily calories) or a low-fat (20 percent of daily calories) diet for two years, when they would retest their lipid levels.

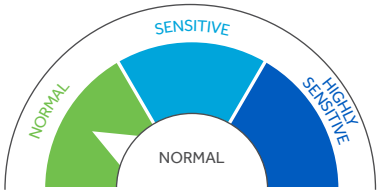
At the end of the study, the men and women who carried the A allele form of this gene were particularly sensitive to dietary fat in that when they ate a low fat diet, their total and LDL cholesterol levels dropped compared to their peers with other genotypes. Conversely, when they ate a higher fat diet, their total and LDL cholesterol levels rose. Other studies have pinned increases in protective HDL cholesterol with other variations of the LIPC gene.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of NORMAL, SENSITIVE or HIGHLY SENSITIVE reflects whether or not your genotypes included those that increased your cholesterol sensitivity to dietary fat.

INSULIN RESPONSE TO DIETARY FAT

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you a NORMAL insulin response to consuming dietary fat. That means you can expect to have a positive insulin response to following a lower fat (about 20%) diet and may experience less insulin sensitivity following a high fat diet. It's important to note, however, that not all fats are created equal and there is good evidence that including healthy fats in your diet can positively rather than negatively impact insulin resistance. The carbohydrates you choose still play a very important role, as well.



Your genetic profile indicates that you have a NORMAL insulin response to consuming dietary fat.

Following a lower fat diet will help you maintain healthy insulin sensitivity and blood sugar levels. It's also important to choose carbohydrates wisely and to not entirely cut out fat, but rather to choose your fats wisely, as fat is essential for good health and beneficial fats can positively impact insulin sensitivity.

SUCCESS STRATEGIES

Aim for a diet that is lower in fat, which means getting about 20 percent of your total calories in the form of healthy fat. Also, swap saturated fats for unsaturated fats, which have a favorable influence on insulin response, when possible (see Types of Fat in Cholesterol Response to Dietary Fat section for more on types of fats). To reduce the fat in your diet and eat more beneficial fats overall:

- Choose plant-based proteins such as beans and meat substitutes over meat several meals a week
- When eating meat, choose lean cuts and skinless poultry, since even lean meats contain saturated fat

RELATED GENES / SNPs

FTO

The gene and associated SNPs included in this category have been shown to have significant associations with a person's insulin response to eating dietary fat.

When most of us think insulin, we think sugar and carbs. However, dietary fat also drives insulin response and has long been vilified as contributing to insulin resistance and subsequent fat storage—especially deep in the abdomen where it wreaks havoc on metabolic health—and chronic conditions like diabetes and heart disease.

Low fat diets have been shown to help some people maintain healthy insulin sensitivity. As with many dietary interventions, however, they didn't and don't work for everyone. There are many reasons why, of course. The type of carbohydrates you replace fats with, how much protein you eat, how much you eat, how much you exercise and the type

FUNCTION

INSULIN RESPONSE TO DIETARY FAT

- Eat fish at least twice a week to increase Omega 3 fatty acids. If vegan, try adding nuts and seeds e.g. walnuts and pumpkin seeds; vegetable oils e.g. rapeseed and linseed; soya and soya products e.g. beans, milk and tofu; and green leafy vegetables.
- Reduce the amount of butter, cream or cheese you use when cooking. Substitute small amounts of olive, coconut or safflower oil instead.

Choose complex carbs. Carbohydrates play a key role in insulin response, regardless of fat intake. If you're eating a lower fat diet, you also will likely be eating more carbohydrates, which makes the ones you choose even more important. It's important to pair your healthy fat intake with complex carbs. Sugary and starchy refined carbs (think processed/milled grains) spike your blood sugar, initiating insulin response, fat deposition and set the stage for insulin resistance, and should therefore be minimized in your diet. When eating healthy fats, combine them with complex carbs such as whole plant foods such as vegetables, legumes, whole grains (such as brown rice, quinoa, steel cut oats and a little fruit).

Use a tracking app. Most of us have no idea what percentage of calories we are eating from fat without assistance. Enter your daily food intake to a diet app or an online nutrition log for a few days to determine how much fat you are currently eating so you can use the tips above to decrease it to your goal levels if it is too high.

of fat you eat all factor into your insulin response. Research shows that there is a genetic component as well.

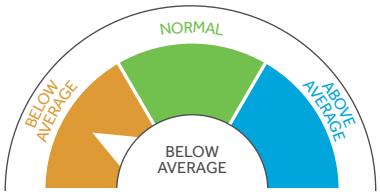
In a study published in *The Journal of Nutrition*, Boston-based researchers genotyped FTO (the gene associated with fat mass and obesity) variants among 743 overweight or obese men and women who were following either a high fat (40% of total calories) or a low fat (20% of total calories) diet for two years. In the end, regardless of how much weight they lost, those who carried certain FTO variations had less improvement in insulin sensitivity/resistance following a low fat diet than following a high fat diet—a finding that echoed an earlier European study, which also found risk allele carriers of FTO benefitted more from a high fat diet when it came to improving insulin resistance.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of NORMAL, SENSITIVE or HIGHLY SENSITIVE reflects how your insulin sensitivity (a good thing, as it prevents/improves insulin resistance) responds when you consume dietary fat.

TRIGLYCERIDE RESPONSE TO CARDIO

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you a BELOW AVERAGE triglyceride response to cardiovascular exercise. *That means you are less likely to see your levels of these harmful blood fats drop (and in some people they tick upward) in response to regular aerobic exercise training.* While that is discouraging, it doesn't mean you should stop or not start exercising. You may need to employ other exercise intensities and other lifestyle and/or medical interventions to bring your triglyceride levels into a healthy range if they are elevated.



Your genetic profile indicates that you are at risk for a BELOW AVERAGE triglyceride response to regular cardiovascular exercise.

If a blood test shows your triglyceride levels are elevated, we recommend that you continue getting at least 150 minutes a day of physical activity a week for good general health and employ other exercise, lifestyle and/or medical interventions to reduce them to healthy levels.

SUCCESS STRATEGIES

Everybody should aim for at least 150 minutes of physical activity a week for good general health. People who are genetically less inclined to see improved blood fat levels from regular cardio can benefit from taking other healthy lifestyle measures, as well.

Step it up. The American Heart Association currently recommends at least 150 minutes per week of moderate exercise like walking, swimming and biking at a pace where you can easily converse, or 75 minutes a week of vigorous exercise where you're exerting yourself enough to be breathing harder and can only speak in short sentences—or a combination of both. Some research suggests that vigorous exercise may do a better job of clearing blood fats

RELATED GENES / SNPs

CYYR1, GLT8D2, RBFOX1, ZNF385D

The genes and associated SNPs in this category have been shown to have significant associations with a person's triglyceride level response to cardiovascular exercise.

Triglycerides are a type of fat that your body uses for energy. You store them in your fat cells and they circulate in your bloodstream. When you have more triglycerides than you're burning, you end up with elevated levels, which are harmful to your body and can cause hardening of the arteries and heart disease.

A simple blood test can tell you your levels, which should fall into a healthy range:

Normal is less than 150 mg/dl.
Borderline-high is 150 to 199.
High is 200 to 499.
Very high is 500 or higher.

Regular aerobic exercise is one of the most effective methods for lowering triglycerides, since your body breaks down

TRIGLYCERIDE RESPONSE TO CARDIO

and lowering triglyceride levels than moderate activity. Include short 5 to 10 minute bursts of harder paced effort into your regular workouts, or devote two sessions a week to vigorous activity.

Lose weight. If you are overweight, losing even just 5 to 10 pounds can help lower triglyceride levels, according to research.

Eat more healthy fats. The type of fat you eat can greatly impact your triglyceride levels. Omega-3 fatty acids like those found in fatty fish like salmon and mackerel are particularly beneficial. Eat fish at least twice a week. Also opt for foods rich in heart healthy monounsaturated fats and polyunsaturated omega-3 fatty acids like olive oil, nuts, and avocado over meats and foods high in saturated fats whenever possible.

Limit sugary and refined foods. Simple carbs like foods made with white flour and sugar are known to raise triglyceride levels.

Watch your alcohol intake. Too much alcohol taxes your liver and can lead to high triglyceride levels. If your levels are high, stick to one drink a day or eliminate alcohol entirely.

fat to fuel activities like walking, biking and swimming. Research shows that, on average, exercise training helps reduce triglyceride levels between 4 to 38 mg/dL. As that range indicates, however, there is a lot of individual variation in how well any given person's triglyceride levels improve from a standard exercise program. It's become clear that genetics play a large role in that regard.

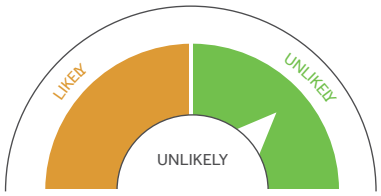
In fact, in a study of 478 men and women who were put on a 20-week endurance training program, variations of these four genes statistically explained 100% of the genetic effect of triglycerides' response to cardiovascular exercise. The good news is that, on average, triglyceride levels decreased over the course of the study. However, those with more favorable genetic variations enjoyed greater reductions while those with higher risk variations actually saw increased levels.

Our analysis investigated which genotype for these genes was present in your DNA. Your rating of BELOW AVERAGE, NORMAL or ABOVE AVERAGE reflects whether your genotype carried more or less favorable variations for lowering your triglyceride levels through cardiovascular exercise. This knowledge can help you create a more effective exercise plan to improve your heart health.

LACTOSE INTOLERANCE

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that make you UNLIKELY to be or become lactose intolerant. That means you should be able to continue to consume dairy products and digest lactose. That's good news because your diet is less restricted and dairy products are a major source of bone and muscle maintaining calcium and vitamin D in the U.S. diet.



Our analysis indicates that your genetic profile exhibits characteristics that make you UNLIKELY to be or become lactose intolerant.

The National Osteoporosis Foundation says adults need 1,000 to 1,200 mg of calcium a day and 800 to 1,000 IUs of vitamin D a day to maintain good bone integrity. You can get those essential nutrients by eating the recommended 3 servings of dairy products a day. If you don't like milk or eat little dairy, you can maintain your bone, muscle and general health by getting these nutrients from alternative food sources.

SUCCESS STRATEGIES

Being able to tolerate lactose doesn't mean you love milk. You can get the dairy-based nutrients you need from yogurt (live cultured is best), cheese and fortified milk alternatives such as soy and almond milk (which is actually richer in calcium than dairy milk).

Eat a variety of calcium and vitamin D rich foods. Eating a wide variety of foods rich in vitamin D and calcium will not only ensure you get enough of those essential nutrients but also other antioxidants and healthy fats as well. Other good sources include canned sardines and wild caught salmon.

If you tan easily and have darker skin, you may need to consume higher levels of vitamin D since darker skinned people become protected by the sun when

RELATED GENES / SNPs

MCM6

This gene and associated SNPs included in this category have been shown to have significant associations with a person's likelihood of being intolerant to the milk sugar lactose.

Lactose intolerance occurs when the small intestine does not make enough of an enzyme called lactase that you use to digest lactose. As lactose passes through the large intestine without being properly broken down and digested, it can cause a host of uncomfortable GI symptoms including gas, bloating, belly pain and diarrhea.

Lactose intolerance is one of the most common inherited conditions in the world, with about 65 percent of the human population experiencing a reduced ability to digest lactose during the course of their lives. It occurs far more often in people of Asian, African, South American and Native American descent than it does among Caucasians of European descent, among whom only about 15 percent of

FUNCTION

LACTOSE INTOLERANCE

they become tan, therefore are less likely to absorb the amount of vitamin D needed for optimal health.

the population experiences the condition. Severity of symptoms varies from person to person. Some with lactose intolerance can take in small amounts, such as 12 grams of lactose (the amount in a cup of milk) with minimal symptoms, while others need to avoid it entirely.

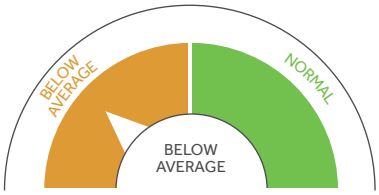
If you currently have lactose intolerance, chances are you know it. If you do not, it doesn't mean you won't develop it sometime in your lifetime. The condition tends to develop over time as lactase activity declines and becomes obvious by teen or early adult years. Some people, however, develop late-onset lactose intolerance, which can show up during your 40s or beyond. In Caucasians (but not other races where lactose intolerance is more common), certain variations of MCM6 are strongly linked to either being lactase persistent, meaning your lactase activity is maintained and you can digest lactose throughout adulthood, or developing lactose intolerance. In one Finnish study, adults with a specific variation of this gene were more than twice as likely to become lactose intolerant as an adult compared to those of other genotypes.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of LIKELY or UNLIKELY reflects whether or not your genotype included those that carried a risk for becoming lactose intolerant.

CALCIUM TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that make you likely to have BELOW AVERAGE blood levels of calcium. That means you are at risk for having inadequate amounts of calcium circulating in your bloodstream, so your body will be more likely to pull what it needs for healthy cellular function from your bones. That's bad because it can lead to osteoporosis—a condition of brittle bones—over time. Be sure to get at least 1,000 mg (men) to 1,200 mg (women) of calcium a day through a vitamin and mineral rich diet and practice bone-building lifestyle behaviors.



Your genetic profile indicates that you are inclined to have BELOW AVERAGE blood levels of calcium.

You can help keep your skeleton strong by eating a bone-building diet, getting regular exercise and practicing other skeleton saving behaviors.

SUCCESS STRATEGIES

Our bones naturally weaken some with age, so it's particularly important that you support your system with what it needs to maintain healthy calcium levels and to keep your skeleton strong.

Eat dairy and calcium rich foods. Dairy foods like milk, cheese and yogurt are excellent sources of calcium, which is why the US Dietary Guidelines recommend three servings of dairy a day to get your daily recommended amount. If you don't like or eat dairy, canned fish like salmon and sardines are excellent sources as are tofu, almonds, beans and fortified alternative milk products. Dark leafy greens like kale and spinach are also high in calcium, but these plant sources of calcium contain compounds that bind to calcium and make it harder to absorb, so they shouldn't be your primary source.

Get enough vitamin D. Calcium doesn't build bones without the assistance of

RELATED GENES / SNPs

CASR, DGKD, GCKR, LINC00709, CARS, LOC105370176, CYP24A1

The genes and their associated SNPs that are included in this category have been shown to have significant associations with a person's blood calcium levels.

Calcium is the most plentiful mineral in the human body and is used by nearly every cell in the body. It's well known that the mineral is essential for maintaining skeletal and dental health, as your bones and teeth are where the lion's share of calcium is stored. Calcium also is required for nerve function, muscle contraction, hormone release and heart health.

Your body keeps the amount of calcium circulating in your bloodstream within a certain range to allow all your specific cells to have what they need to perform their jobs. When those levels dip below that range, your body pulls what it needs from your skeleton. Over time that leads to weakened bones.

FUNCTION

CALCIUM TENDENCY

Your calcium levels are influenced by your diet, how well your intestines absorb the calcium you take in, levels of phosphate in the body, your vitamin D levels and by levels of certain hormones like parathyroid hormone, calcitonin and estrogen. Emerging research also shows that your genotype may influence blood calcium levels. In one very large study of 39,400 men and women, researchers found variations in these genes had a significant impact on blood calcium levels, which echoes findings from previous animal research as well as a study of 1,747 twins that estimated heritability to be 33 percent for blood serum calcium levels.

Our analysis investigated which genotype for these genes was present in your DNA. Your rating of NORMAL or BELOW AVERAGE reflects whether or not your genotypes included those that increased your risk for low blood calcium levels.

vitamin D. Low calcium levels and low vitamin D levels often go hand in hand. So be sure to get enough of this essential nutrient. Fortified dairy and fatty fish are excellent sources. Also consider taking a vitamin D supplement of 2,000 IUs, which is well within the safe range.

Ramp up your intake of vitamin K. This little talked about vitamin plays an important role in calcium regulation and bone formation. Vitamin K must be present for Vitamin D to be absorbed. Low levels of vitamin K have been linked to low bone density. Eating just one serving of lettuce or other vitamin K-rich leafy green vegetables may cut the risk of hip fracture in half, according to the Harvard Nurses' Health Study. Just one serving of broccoli, Brussels sprouts or dark leafy greens delivers the 90 to 120 micrograms you need.

Consider a supplement. Calcium supplements are a source of research controversy. Some studies report that they are not useful for preventing fractures and may be linked to increase risk for heart disease. If you are concerned that you're not getting enough calcium in your diet, see your physician and get a blood serum nutrient test to find out if your levels are low. If you choose to supplement, stick to 500 mg to 600 mg a day, so as not to exceed the recommended daily amount.

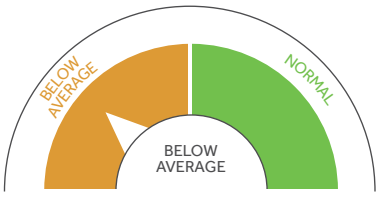
Build your bones. Your bones need some stress to get the signal to grow. Activities that include a little impact such as walking, jogging and tennis as well as activities that make your muscles work hard (which in turn stresses your bones) such as gardening help keep them strong. Strength training two or three days a week has also been shown in studies to build and maintain bone density. Numerous studies have found that even people with low and very low bone density see significant bone density gains—improving about 1 percent a year—in their spine and hips, which are the areas affected most by osteoporosis, when they participate in a regular a strength training routine.

Cut out the cola. The research is still equivocal, but there's compelling evidence that drinking too much cola can weaken your bones because the high levels of phosphorous it contains alters your calcium/phosphorous balance in an unfavorable direction. The Framingham Osteoporosis study found that women who reported drinking cola every day had lower bone mineral density than woman who said they drank it less than once a month.

COPPER TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that make you likely to have a BELOW AVERAGE blood copper level. It's important to maintain a healthy level of this essential mineral as it plays a key role in red blood cell production, immunity and the formation of collagen, which is necessary for maintaining healthy bones and connective tissues. Fortunately, there are many ways to boost your intake of copper to get the daily 900 micrograms you need to achieve and maintain healthy blood levels. The upper limit before copper becomes toxic is quite high, so even if you get a bit more from food, that's okay.



Your genetic profile indicates that you are likely to have a BELOW AVERAGE blood level of copper.

You can boost your blood levels by taking steps to get and maintain more copper in your diet by eating a diet rich in copper and adopting other healthy lifestyle habits that will ensure you obtain adequate amounts of this essential mineral.

SUCCESS STRATEGIES

Many people do not get the optimum amount of copper in their daily diet. It's particularly important for your genotype to seek out foods that are rich in copper to maintain healthy levels.

Eat more copper heavy hitters. Good sources of copper include: Shellfish such as oysters, clams, mussels, crab and lobster Mushrooms Tree nuts such as cashews, pecans, almonds, and macadamia nuts Legumes such as navy beans, peanuts, lentils, and soybeans Fortified cereals and whole grains Dark leafy greens Potatoes and sweet potatoes Dried fruit Cocoa and semi-sweetened chocolate

*Cook with copper.** Additional copper can come from boiling water in a copper kettle and cooking with copper cookware.

RELATED GENES / SNPs

SMIM1, SELENBP1

The genes and their associated SNPs that are included in this category have been shown to have significant associations with a person's blood copper levels.

Copper is an often overlooked essential mineral that helps your body absorb iron and form red blood cells, maintains immunity, assists with energy production and helps keep bones, connective tissues, nerves and blood vessels healthy. The recommended daily amount is 900 micrograms a day. Copper is toxic in very high doses and toxicity is most often associated with a rare condition called Wilson's disease. Chronically low copper levels can pave the way for heart disease, poor bone and joint health and low immunity. Marginal to low levels of copper may occur with too much zinc supplementation (popular in the prevention and treatment of colds), dietary deficiencies and in some cases because of genetic influences.

FUNCTION

COPPER TENDENCY

Take a multivitamin. A standard daily multivitamin will provide about 25 percent of your daily copper needs.

Avoid high doses of iron, zinc and vitamin C. Taking high doses of zinc and vitamin C for colds as people sometimes do isn't recommended if you trend toward low blood levels of copper. Research suggests that 50 mg a day of zinc and 1500 mg a day of vitamin C can interfere with copper absorption, as can high levels of iron.

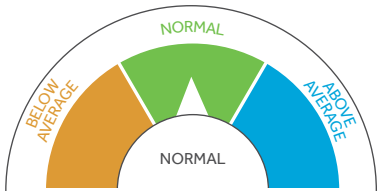
In one widespread analysis of more than 12,000 adults, genetic variations accounted for 5 percent of variation in blood copper levels. That's a small percentage, but can be significant when considering a trace mineral. Surveys also suggest that while true deficiency isn't common, many people don't get enough copper in their diet and taking high amounts of zinc, iron or vitamin C can cause an unfavorable copper blood levels.

Our analysis investigated which genotype for these genes was present in your DNA. Your rating of NORMAL or BELOW AVERAGE reflects whether your genotype included those that carried a risk for having low levels of this essential mineral.

MAGNESIUM TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that make you likely to have a NORMAL blood magnesium level. That's good news because magnesium plays an essential role in hundreds of biochemical processes including regulating blood sugar, blood pressure, muscle contraction and heart rhythm. As we age, our body's ability to absorb magnesium decreases, so it's important to eat plenty of magnesium-rich foods to maintain healthy levels of this essential mineral.



Your genetic profile indicates that you are likely to have NORMAL blood levels of magnesium.

You can maintain those healthy blood levels of this essential mineral by eating plenty of magnesium-rich foods and avoiding those that deplete it.

SUCCESS STRATEGIES

Maintain healthy blood magnesium levels by including magnesium-rich foods in your daily diet. Good sources include dark leafy greens, nuts and seeds, fatty fish, avocado, beans, whole grains, yogurt, soy foods and bananas. If you like dark chocolate, you're in luck. One 2-ounce chunk delivers about a quarter of your daily needs. Drink alcohol and coffee in moderation, as both of those can lower magnesium levels by blocking absorption and increasing excretion. Also, skip the soda. Sugary sodas are also linked to lowered magnesium levels.

Though too much magnesium from your diet doesn't pose a problem because your kidneys simply eliminate it in your urine, it is possible to overdo it from supplements and other sources. Overuse of laxatives or antacids can lead to high levels, which can cause diarrhea, nausea and abdominal cramping.

RELATED GENES / SNPs

MUC1, SHROOM3, TRPM6, DCDC5, ATP2B1, MDS1

The genes and their associated SNPs that are included in this category have been shown to have significant associations with a person's blood magnesium levels.

Magnesium doesn't get much attention in mainstream nutrition circles, but it should. The mineral plays a critical role in blood sugar control, muscle contractions and heart rhythm and is involved in more than 300 biochemical reactions in your body.

Some medical experts have recently dubbed magnesium deficiency the "invisible deficiency" because it's very difficult to pinpoint as the most common symptoms such as fatigue and muscle cramping are common side effects of many conditions. It's also very common. Studies show that only about a quarter of US adults get the 320 mg (women) to 420 mg (men) they need.

Though only about 1 percent of your magnesium is found in your blood, low

FUNCTION

MAGNESIUM TENDENCY

serum magnesium levels have been associated with multiple chronic diseases such as diabetes, heart disease and high blood pressure. Though low magnesium is generally a condition that occurs over time due to habitually low magnesium intake, high intakes of alcohol, soda and caffeine, and/or taking medications that interfere with its absorption can also cause levels to dip. There's also a genetic influence. Research shows that serum magnesium concentrations are about 27% heritable.

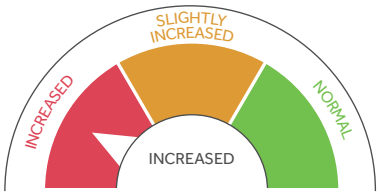
In one study of 15,366 men and women, researchers identified six gene variations that were associated with blood magnesium levels. These findings echoed those of another study that found these gene associations in both Caucasian and African American populations. The effects were most pronounced in post-menopausal women and/or people with low insulin levels.

Our analysis investigated which genotype for these genes was present in your DNA. Your rating of BELOW AVERAGE, NORMAL or ABOVE AVERAGE reflects whether your genotype included those that carried a risk of having low levels of this essential mineral or whether you were likely to have adequate levels.

DIETARY CHOLINE TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that gi e you an INCREASED sensitivity to low choline intake. That means you are significantly mo e likely to experience organ dysfunction like fatty liver and/or muscle damage in response to eating a diet that is low in choline. Surveys show many adults, especially older adults, fall short in their choline intake. Because of your genetic predisposition, it's particularly important that you avoid low choline levels by increasing your intake of choline-rich foods. Since animal foods are the primary source in the US diet, pay especially close attention to this nutrient if you follow a vegetarian or vegan diet.



Your genetic profile indicate that you have an INCREASED sensitivity to a low-choline diet.

Since you are more likely to suffer organ dysfunction and muscle damage should your choline intake fall below recommended levels, you should make it a priority to eat plenty of choline-rich foods for optimum cell, nerve and organ function.

SUCCESS STRATEGIES

We all create a small amount of choline as part of our normal metabolism. But you also need to eat foods with this essential nutrient to get adequate amounts for healthy cell, nerve, organ and muscle function. As someone who is genetically inclined to be very sensitive to the effects of a low-choline diet, it's particularly important that you seek out choline-rich foods.

Build a better breakfast. Your morning meal is an easy place to rack up substantial amounts of choline. Two eggs (147 mg each) and a cup of milk (38 mg per 8 oz) deliver 332 mgs of this essential nutrient. As a reminder, the US Dietary Guidelines lifted the limits on dietary cholesterol, so you can eat your omelet guilt free.

RELATED GENES / SNPs

PEMT

This gene and its associated SNPs that are included in this category have been shown to have significant associations with a person's sensitivity to low choline levels in their diet.

Choline is an essential nutrient that your body uses to keep cells and nerves working properly. It is particularly important for maintaining liver, muscle and brain function. It plays an important role in fetal brain development and for preventing neural tube birth defects.

The Institute of Medicine recommends 425 mg (women) to 550 mg (men) of choline per day. Pregnant women need 450 mg a day. Choline is found in many foods, but is most prevalent in animal foods like eggs, liver, fish and meats. Low l vels of choline can lead to organ dysfunction, particularly fatty liver, and muscle damage.

FUNCTION

DIETARY CHOLINE TENDENCY

Be more mindful if you don't eat meat. If you're a strict vegetarian or vegan, you may be at a higher risk for low dietary choline. Soymilk provides 57 mg per cup and is a good source. Other choline-rich foods to include in y our diet are fortified grain products, quinoa, peanut butter, pistachios, tofu, broccoli, Brussels sprouts and wheat germ.

Consider a supplement. If your diet runs low in choline-rich foods, y ou may want to consider taking a choline supplement to ensure you reach your adequate intake.

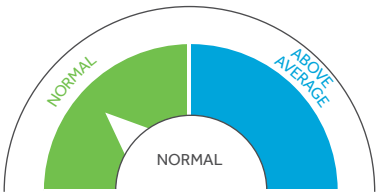
A study published in 2009 in Nutrition Reviews reported that the average choline intake among men and women is below Adequate Intake. Women appear most likely to fall short. Though some people will not develop adverse symptoms from eating a low choline diet, certain genetic variations (specifically car ying the C allele, especially being homozygous or carrying identical CC alleles) make you far more susceptible to organ dysfunction and muscle damage if you fall below the advised amounts. Research suggests that up to 75 percent of the population may have DNA configurations that le ve them susceptible to choline deficienc . This effect is particularly pronounced in women, particularly post-menopausal women, as estrogen appears to exert protective effects.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of NORMAL, SLIGHTLY INCREASED or INCREASED reflects the degree to which you are susceptible to organ dysfunction and muscle damage in response to having low dietary intake of choline.

SELENIUM TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you NORMAL blood selenium levels. That means that, like the majority of Americans, you likely have an adequate, healthy intake of this essential mineral. That's good news because selenium is necessary for strong immunity, cellular function, reproductive health and thyroid hormone production.



Your genetic profile indicates that you are likely to have NORMAL blood levels of selenium.

You can maintain healthy, adequate levels of this essential mineral by eating a diet rich in whole, unrefined foods.

SUCCESS STRATEGIES

According to the National Health and Nutrition Examination Survey (NHANES), the average daily selenium intake among Americans is 108.5 mcg. So most of us get more than enough and supplements aren't recommended.

Eating a diet high in refined foods can leave you with lower than average selenium levels, because selenium is destroyed in processing. So be sure to fill your plate with whole foods whenever possible. Rich sources of selenium include fish, shellfish and seafood like tuna, shrimp, sardines, salmon, mushrooms, asparagus, poultry, tofu, eggs, grains, sunflower seeds, spinach, cabbage, milk and Brazil nuts (which you should only eat occasionally because they're extremely high in selenium).

RELATED GENES / SNPs

DMGDH

The gene and its associated SNPs that are included in this category have been shown to have significant associations with a person's blood levels of selenium.

Selenium is an essential mineral that plays multiple roles in maintaining good health. It works as an antioxidant with other nutrients such as vitamin E in the body to fend off free radical damage; it is vital to immune system function, male fertility and sperm health, and thyroid hormone metabolism.

Low levels of selenium have been shown to increase your risk for auto-immune disorders such as thyroid disease and psoriasis, infections and maybe even certain cancers.

Selenium is found across the dietary spectrum from seafood and meat to grains (and grain-based foods) and nuts, seeds and leafy greens. Adults need about 55 micrograms of the mineral a day and

FUNCTION

SELENIUM TENDENCY

most Americans get enough through a balanced diet. Selenium is found in the soil. So how much you get from your food depends on the mineral content of the soil in which the plants you, and the animals you eat, are grown. Selenium is destroyed in food processing, so eating a diet high in refined foods can put you at risk for lower selenium levels. Blood selenium levels also are influenced by genetic factors.

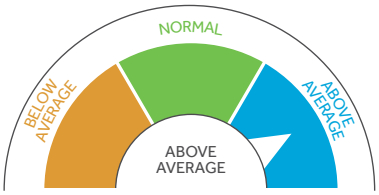
In one widespread analysis of more than 12,000 adults, genetic variations accounted for four percent of variation in blood selenium levels with minor alleles at this SNP increasing the average blood levels. That's a small percentage, but can be significant when considering a trace mineral. It's also possible to have too much of a good thing. Selenium is toxic in very high doses, which can cause GI distress, fatigue, hair loss and fingernail discoloration.

Our analysis investigated which genotype for this gene was present in your DNA. Your rating of NORMAL or ABOVE AVERAGE reflects the selenium levels that are likely to be present in your blood.

ZINC TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you the likelihood of having ABOVE AVERAGE blood zinc levels. Research shows that people with healthy adequate levels of this essential mineral are better able to fend off diseases like colds and viral infections, and are less susceptible to chronic diseases like heart disease and diabetes than those with low levels, so that's good news. Of course, your genes don't automatically guarantee that you will have healthy zinc levels if your diet falls short. So continue eating zinc rich foods on a daily basis.



Your genetic profile indicates that you are likely to have ABOVE AVERAGE blood levels of zinc.

You can take advantage of your favorable genetic tendencies by eating a diet that contains foods rich in zinc to get the 8 to 11 mg of zinc you need each day to maintain healthy cellular function and strong immunity.

SUCCESS STRATEGIES

As someone who is genetically inclined to have above average blood zinc levels, there's no need to worry about taking supplemental zinc. Pay closer attention to your intake of zinc-rich foods if you're over 60, however. Data from the National Health and Nutrition Examination Survey found that 35 to 45 percent of older adults fell below recommended levels of this essential mineral.

Good food sources include oysters, crab, lobster, pork, chicken, yogurt, baked beans, cashews, oatmeal, milk, kidney beans, almonds, chickpeas and fortified grains.

Be mindful of your zinc intake if you're a vegetarian or vegan. The zinc in plant foods is harder for the body to absorb, so some experts suggest that people

RELATED GENES / SNPs

CA1, PPCDC, LINC01420

The genes and their associated SNPs that are included in this category have all been shown to have significant associations with a person's blood levels of zinc.

Zinc is an essential trace element that plays a key role in immune function, protein synthesis, wound healing, insulin function, reproduction, thyroid function, blood clotting, growth, taste, vision and smell. After iron, it's the most common mineral in the body and is found in every cell.

You don't need much zinc to perform all these functions. The recommended dietary allowance for adults is just 8 mg (women) to 11 mg (men). But you do need zinc in your daily diet because the body doesn't store it.

Zinc deficiency hinders immune function and has been associated with cardiovascular disease and diabetes.

FUNCTION

ZINC TENDENCY

who don't eat animal products aim for 50% more zinc than the recommended daily allowance just to be sure the body gets what it needs.

Though outright deficiency is uncommon in industrialized countries like America, there is evidence that relative zinc deficiency and marginal zinc levels may be somewhat common among certain populations, particularly among older people as well as vegetarians, since red meat and poultry provide the majority of zinc in the American diet and zinc from plant sources is slightly harder for the body to absorb. Taking too much zinc, which can happen when people supplement the mineral—a popular practice for staving off cold infections—can cause toxicity, which results in nausea, vomiting, GI distress, loss of appetite and headaches.

Genetics can influence a person's zinc blood levels. In one widespread analysis of more than 12,000 adults, genetic variations accounted for 8 percent of the variation in blood zinc levels. Our analysis investigated which genotype for these genes was present in your DNA. Your rating of BELOW AVERAGE, NORMAL or ABOVE AVERAGE reflects the zinc levels that are likely to be present in your blood.

LINKS TO RELATED STUDIES:

SUN SENSITIVITY

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A genome-wide association study identifies novel alleles associated with hair color and skin pigmentation

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A polymorphism in IRF4 affects human pigmentation through a tyrosinase-dependent MITF/TFAP2A pathway

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SKIN AGING FACIAL AGING

J Invest Dermatol. 2013 Apr;133(4):929-35. doi: 10.1038/jid.2012.458. Epub 2012 Dec 6.

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