StrongDNA®

Unlock the power of your genetic code

ExtendRX

Healthy Aging Panel

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

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Welcome to Your ExtendRX Personal Report

ExtendRX Personal Report
March 18, 2020

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 road map 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	NORMAL	RF4, LOC105374875, NTM, TYR, HERC2, MC1R, CPNE7, MC1R, RPS2P1, ASIP
Skin Aging	NORMAL	IRF4, SPATA33, RALY/ASIP, BNC2
Skin Glycation	BELOW AVERAGE	AGER, GLO1
Facial Aging	NORMAL	STXBP5L
Strech Marks	NORMAL	ELN, SRPX, HMCN1, LOC105373353
Fat Loss Response To Cardio	ENHANCED	ADRB2, LPL
Body Composition Response To Strength Training	NORMAL	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

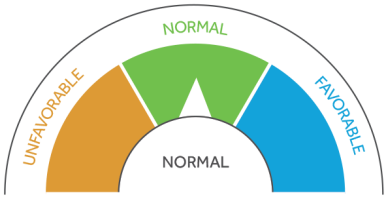
Mental Acuity	LOWER	APOE, BDNF
Age Related Hearing Loss	HIGHLY INCREASED	GRM7
Longevity	NORMAL	FOXO3, APOC1 (APOE-CI-CII)
Fitness Response To Cardio	NORMAL	AMPD1, APOE
Systemic Inflammation	ABOVE AVERAGE	CRP, APOC1 (APOE-CI-CII), HNF1A
Polyunsaturated Fatty Acid Tendency	SLIGHTLY ABOVE AVERAGE	FADS1-2
Cholesterol Response To Dietary Fat	NORMAL	LIPC
Insulin Response To Dietary Fat	NEUTRAL	FTO, PPM1K
Trig Response To Cardio	ABOVE AVERAGE	CYYR1, GLT8D2, RBFOX1, ZNF385D
Lactose Intolerance	UNLIKELY	MCM6
Calcium Tendency	NORMAL	CASR, DGKD, GCKR, LINC00709, CARS, LOC105370176, CYP24A1
Copper Tendency	BELOW AVERAGE	SMIM1, SELENBP1
Magnesium Tendency	NORMAL	MUC1, SHROOM3, TRPM6, DCDC5, ATP2B1, MECOM
Dietary Choline Tendency	INCREASED	PEMT
Selenium Tendency	ABOVE AVERAGE	DMGDH
Zinc Tendency	NORMAL	CA1, PPCDC, LINC01420

LOOK

SUN SENSITIVITY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you a NORMAL level of sun sensitivity. That means that your skin will likely burn during prolonged amounts of unprotected exposure to the sun's UV rays, but that it will also likely eventually tan. It's important to remember that there is no such thing as a "healthy" tan, however, and that unprotected sun exposure can cause early aging of your skin and increase your risk for skin cancer.



Your genetic profile indicates that you are inclined to have a NORMAL level of sun sensitivity.

We recommend that you protect your skin from any chance of burning and the long-term risk for skin cancer by taking some common sense steps to protect your skin from UV ray exposure.

SUCCESS STRATEGIES

Having skin that isn't especially prone to burning means that you can expose your skin to small amounts—15 minutes or so—of unprotected sunlight, which helps your body create Vitamin D. But you still need to be mindful of the potential long-term damage and increased skin cancer risk from prolonged exposure. Here's how to keep your skin safe.

Wear sunscreen. When you're going out for the day, wear sunscreen. 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.

Cover your vulnerable spots. Wear a hat to cover your head, face and ears, which are especially susceptible to long term exposure and sun damage.

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.

LOOK

SUN SENSITIVITY

Be mindful of midday exposure. 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 light cover up or umbrella to give your skin some shade.

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 your skin's attempt to protect itself from further

LOOK

SUN SENSITIVITY

damage, it does not mean that good tanners are immune to sun damage or related skin cancer.

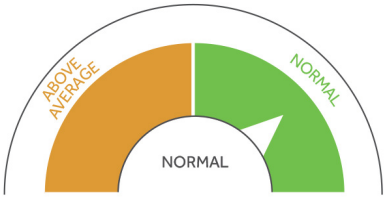
Our analysis investigated which genotypes for these genes were present in your DNA. Your rating of FAVORABLE, NORMAL, or UNFAVORABLE reflects your tanning response, which in turn reflects your level of sun sensitivity and likelihood of burning.

LOOK

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

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 component

LOOK

SKIN AGING

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.

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.

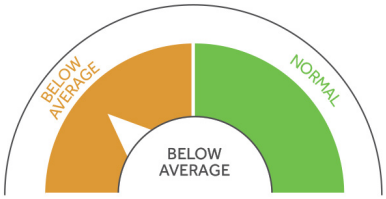
Our analysis investigated which genotype for these genes was present in your DNA. Your rating of either NORMAL or ABOVE AVERAGE indicates the likelihood that you will develop age spots over time.

LOOK

SKIN GLYCATION

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you a BELOW AVERAGE level of protection against skin glycation. That means you are more susceptible to AGEs (advanced glycation end products) damage and premature skin aging as evidenced by marked loss skin tone in the form of sagginess and wrinkles.



Your genetic profile indicates that you are likely to have BELOW AVERAGE levels of protection against AGEs (advanced glycation end products) and skin glycation.

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

SUCCESS STRATEGIES

Even if you don't necessarily stress about wrinkles and skin tone, it's important to protect yourself against skin glycation because the AGEs that damage the integrity of your skin are also wreaking havoc on the organs inside your body that you can't see. Here's how to minimize the levels of AGEs in your system.

Avoid simple sugars. Not surprisingly, the best way to minimize your exposure to this glucose-driven cell damage is to avoid dumping tons of the sugary stuff into your system. That means minimizing your intake of simple sugars like white sugar and especially fructose and high fructose corn syrup, which studies show increase your rate of glycation by 10 times. Stick to 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 appear to make them more susceptible to the effects of AGEs.

LOOK

SKIN GLYCATION

Be wary of BBQ. Cooking or caramelizing foods at high temperatures as with barbequing creates AGEs, which when you eat them can do their damage to your collagen and elastin fibers, creating skin glycation. Eat these foods sparingly.

Eat more blueberries. Blueberries are rich in antioxidant compounds called anthocyanins, which are particularly potent for blocking AGE formation and collagen breakdown. Make them one of your two to three servings of fruits you eat each day.

Drink green tea. Well known for its cancer-fighting properties, green tea contains a powerful antioxidant compound called epigallocatechin gallate (EGCG) that protects your skin and interferes with the glycation process.

Get ample vitamin C. Your body uses the antioxidant vitamin C to produce collagen. Eat at least five servings of fruits and vegetables a day to get your fill of this protective micronutrient. Citrus fruits, peppers and strawberries are particularly good sources.

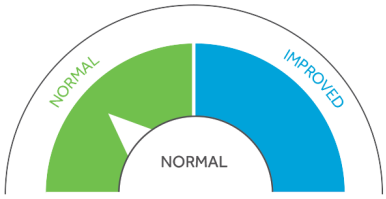
The main enzyme that protects your cells from AGEs is known as glyoxalase 1. The gene that influences that activity is GLO1. In a recent study of 326 men and women with either healthy blood sugar levels or with type 1 or type 2 diabetes, researchers found that the specific SNP variations in the GLO1 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 gi e you a NORMAL degree of visible skin aging. That means that your skin is likely to develop fine lines y 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 extra brillar 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 bers. 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 perso '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 rst 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. ou can find those i 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 our 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.

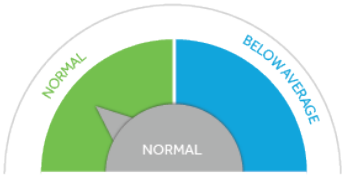
Get your beauty sleep. There's a reason it got that nickname. Lack of sleep ages your skin, making it look sallow and lackluster. Long term, short sleep increases levels of your stress hormone cortisol, which can break down collagen.

LOOK

STRETCH MARKS

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you a NORMAL likelihood of developing stretch marks. That means you may develop visible lines of scarring during times of relatively rapid weight changes, but are not prone to excessive striations.



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

You can reduce your risk even further by practicing healthy diet, exercise and lifestyle habits to maintain healthy skin elasticity.

SUCCESS STRATEGIES

As with most conditions, the best treatment for stretch marks is prevention. Once they occur, they will generally fade over time. Practicing healthy skin hygiene can help prevent their occurrence and expedite their fading.

Mind your hydration. Supple, well-hydrated, skin is resilient skin, which is what you want to prevent damage like stretch marks. The Institute of Medicine recommends that women drink about 9 cups of fluids per day and men drink about 13 cups a day to maintain optimum hydration.

Eat more "skin food." Your skin is an organ like any other and requires a balanced diet of nourishing ingredients to maintain optimum function. Emphasize these skin-building nutrients to help minimize your risk of stretch marks.

Silica: Silica is a little talked about trace mineral that strengthens your connective tissues. You can get it from asparagus, whole grains, oats, beets and corn.

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

Omega-3 fatty acids: Essential fatty acids, especially omega-3s, help your skin repair and regenerate. Cold water fish like salmon and mackerel, as well as flax seeds, are excellent sources.

Zinc: This mineral helps control the production of oil in your skin. You can get what you need through shellfish, pumpkin seeds, oats, eggs and Brazil nuts.

Selenium: This antioxidant mineral helps your skin fend off damage and maintain elasticity. Whole grains, nuts, eggs and seafood are good sources.

Vitamin C: This antioxidant plays an essential role in collagen synthesis, which helps maintain the integrity of your skin. Excellent sources include citrus fruits, bell peppers and leafy greens.

Vitamin A: This well-known wrinkle fighter also promotes skin regeneration. Get what you need through foods rich in beta carotene (a precursor to vitamin A) such as orange and yellow fruits and vegetables such as carrots, bell peppers and sweet potatoes, as well as dark leafy greens.

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.

Stay moisturized. There's no silver bullet against stretch marks. But a good moisturizer improves the suppleness and appearance of your skin.

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 contractual 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 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 an ENHANCED fat loss response to cardio. Your score reflects the fact that your genotype showed 'favorable' gene combinations. This means that, based on your genes, you likely would show a slightly higher fat loss response to a basic cardio exercise program than other genotypes. Thus you can expect to lose a usual to higher amount of body fat by participating in cardio exercise that is of a moderate-to-vigorous intensity.

Even though you may have an enhanced response to a lifestyle intervention, this doesn't mean that losing body fat and keeping it off will be effortless. Not everyone loses the same amount of body fat when they embark upon an exercise program. Genetic predisposition plays a role in fat loss, but other factors can also affect how much fat you lose. You can experience greater fat loss by exercising longer and/or at a higher intensity.

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

You should experience slightly more fat loss than other genotypes when performing cardio exercise 3-5 days per week for a total of 150-250 minutes. Examples of what this type of exercise plan would look like are either several exercise dance classes and an indoor cycling class per week or 3-5 sessions in a week walking or climbing briskly on a treadmill or elliptical trainer for 50-60 minutes.

SUCCESS STRATEGIES

Your genetic profile predicts that you can expect a favorable fat-loss result from doing at least 150-250 minutes of cardio exercise 3-5 days per week, working out at a moderate-to-high intensity.

- If you want to see greater fat loss benefits from exercise, you should increase the length of time of your exercise session, and/or the intensity of your exercise session.
- Make sure to include muscle-strengthening moves such as squats, lunges and upper body exercises with weight on at least 2 days per week.

RELATED GENES / SNPs

ADRB2, LPL

The genes and their associated SNPs that are included in this category have been shown in a study to have significant associations with a person's ability to lose fat from a regular program of 3 days per week of cardio exercise. A large study investigating these genes put sedentary men and women on a 20-week cardio exercise program. The study volunteers exercised on a bike 3 times per week, starting at a moderate intensity for 30 minutes per session over the first few weeks. They built up to a longer, slightly harder workout that lasted 50 minutes for the last 6 of the 20 weeks.

Men in the study did not appear to have a different response based on their genotype. Women's fat loss was influenced by

LOOK

FAT LOSS RESPONSE TO CARDIO

- Begin your cardiovascular exercise session in a semi-fasted state; First thing in the morning or 3-5 hours since your last meal/caloric drink.

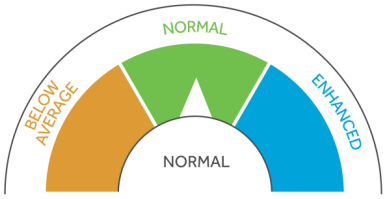
genotype, however. Women who carried the most 'favorable' genotypes lost slightly more fat in response to a cardio exercise program than those who did not carry these 'favorable' genotypes.

Our genetic analysis investigated which genotype for each of these genes was present in your DNA. Your rating of either NORMAL or ENHANCED reflects whether your genotypes included those that carried an enhanced fat loss response from a regular program of cardio exercise.

BODY COMPOSITION RESPONSE TO STRENGTH TRAINING

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits a NORMAL body composition response to resistance training exercise. That means you are likely to experience some weight loss and reduced body fat from weight training, but not as much as someone with a more favorable genotype might. That doesn't mean you should abandon strength training, of course. Even if you aren't inclined to lose weight through resistance training, lifting weight still improves your body composition by helping you to build and maintain lean muscle tissue, which you naturally lose as you get older. More lean muscle means you're stronger and have more energy for all kinds of physical activity and makes you look better as well. By including ample amounts of cardio exercise in your weekly routine you can increase your fat burning to optimize your body composition.



Your genetic profile indicates that your body composition response to strength training is NORMAL.

You are likely to lose some body fat in response to a strength training routine, but not as much as someone with a more 'favorable' genotype. We recommend that you incorporate fat-burning cardio workouts on most days of the week along with challenging resistance training sessions 2 to 3 days a week to optimize your body composition.

SUCCESS STRATEGIES

Resistance training at least twice a week will help you improve strength and build and maintain lean tissue, which helps improve your overall body composition. The other side of the body composition equation is fat loss and/

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

BODY COMPOSITION RESPONSE TO STRENGTH TRAINING

or maintaining a healthy weight, which you can do by eating a balanced diet and performing about 50 minutes of aerobic exercise 5 days a week.

Studies show that most new lifters don't lift weight that is heavy enough to stimulate muscle tissue growth. So when you do lift be sure to choose a weight that is heavy enough that the final few times you try to lift it are very hard (but you can maintain good form.) 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.

You may also get more fat-burning from your resistance training sessions by trying challenging full body strength training workouts that also significantly raise your heart rate such as kettlebell workouts and/or boot camp style strength training classes.

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.

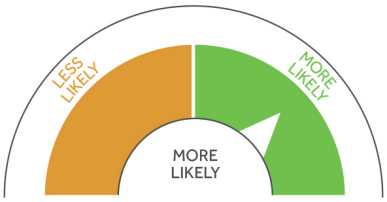
In one large study, researchers had 148 volunteers participate in an intense resistance training program for one year. They found that those who carried the most "favorable" gene variations enjoyed a full gamut of body composition benefits and not only improved their strength and muscle mass, but also 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 exercises 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.

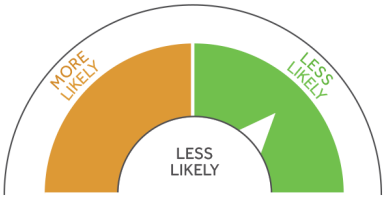
Our analysis investigated which genotype for this gene was present in your DNA. Your rating of either MORE LIKELY or LESS LIKELY reflects whether your genotypes included those that carried a risk for being low in intrinsic motivation or for being likely to be high in intrinsic motivation.

FEEL

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 11,075

ADDICTIVE BEHAVIOR / STIMULUS CONTROL

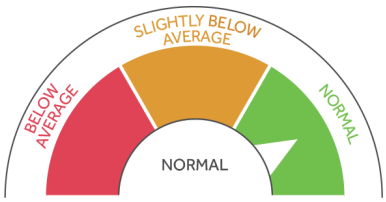
fatal health conditions, including heart disease, respiratory tract infections, cancer (particularly lung cancer) and slower recovery from injuries, as well as generally poorer health. Your present and future health can improve dramatically when you cease smoking completely.

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

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

☺ FEEL

IMPULSE CONTROL & TASTE PREFERENCE

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.

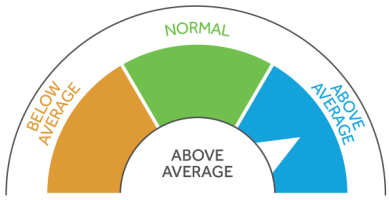
Results from the Baltimore Longitudinal Study of Aging (BLSA) indicate that people who carry a risk allele of the FTO gene are not only at a 67% higher risk for becoming obese, but also for having reduced activity in the region of the brain that dictates impulse control and taste preference, leaving 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,

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.

occupation, light exposure and general health influence how much (or 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.

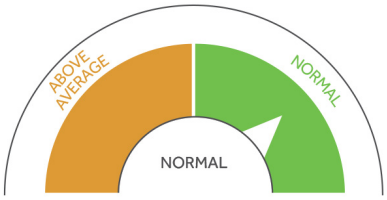
Trending your sleep duration in a healthy direction may also set the stage for improved sleep hygiene and better sleep duration long term, which may trigger a cascade of further genetic outcomes. One British study reported that there are approximately 500 genes that are affected by sleep duration. When 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

FEEL

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.

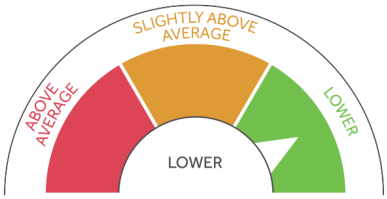
Because added sugar is found in so many surprising places, even the most health conscious people may consume much more than they realize or intend. So we all need to make a concerted effort to read labels and keep our intake in check. What's more, there appears to be a genetic component to the body's 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.

MENTAL ACUITY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your gene profile exhibits characteristics that make you at a LOWER than average risk for mental acuity decline with age. That means you are less likely to experience age-related problems with memory and brain function. That's good news. Remember, however, many lifestyle and behavioral factors impact your brain health and cognitive ability. So, it's still wise to take care of your brain's health and sharpen your mind with a healthy diet and physical as well as mental exercise.



Your genetic profile indicates that you are at a LOWER than average risk for mental acuity decline with age.

Use those genes to your advantage and engage in lifestyle habits and physical and mental exercises that can actually build your brain and create a large cognitive reserve as you get older

SUCCESS STRATEGIES

Regardless of our DNA, we all harbor some concerns about declining mental sharpness with age because it is essential to our independence, physical well being and simple joy of life. You can maximize your genetic potential and preserve or even enhance your cognitive function by adopting a lifestyle that includes regular physical exercise, continual learning and cognitive stimulation and a diet that is high in essential nutrients.

Follow the Mediterranean model. A traditional Mediterranean diet that is rich in olive oil, fish, vegetables, beans, nuts, fruits, whole grains and is low in refined sugars and meat, has been shown to be the best diet for brain health because it is high in anti-inflammatory monounsaturated fats, which protect your arteries (your brain needs good circulation) and your general health. One Columbia University study that tracked the eating habits of nearly 2,000 men and women for close to five years found that those who most closely

RELATED GENES / SNPs

APOE, BDNF

The genes and their associated SNPs that are included in this category have been shown to have significant associations with age-related mental acuity decline.

Brain-derived neurotropic factor (BDNF) is a protein that helps you grow new brain cells and helps keep your existing neurons alive. It's vital for learning, short and long term memory and higher thinking. It is encoded by the BDNF gene. It also appears to be an important marker of cognitive health and memory in women (though for reasons not yet clear, the association is not strong in men).

One study of 369 older adults, average age of about 73, found that women who had one of two minor variations of this gene had an increased risk of poorer cognitive performance (memory and perceptual speed, how quickly your brain interprets and organizes information) as compared with their peers who carried major forms of the

MENTAL ACUITY

followed a Mediterranean style diet showed a 28 percent lower risk of mild cognitive impairment compared to those who did not follow Mediterranean eating patterns. Moderate consumption of alcohol, particularly wine, that is a hallmark of this diet may have its own protective effect against mental acuity decline.

Exercise at least 30 minutes a day. Physical activity is essential for brain health. When you exercise, you dramatically increase the production of neurotropins such as BDNF, which promotes stem cell division and new brain cell formation, effectively doubling or tripling the production of neurons. In one study, researchers had 59 sedentary adults either start an aerobic exercise program (brisk walking) or remain sedentary for 6 months. After just three months, scans showed that the exercisers had built their brains so that they had the volume of people three years younger. One meta analysis of 15 studies that included more than 33,000 men and women followed for up to 12 years showed that people with the highest levels of physical activity were 38 percent less likely to show signs of mental acuity decline over time compared to their peers who did very little activity. It only takes 30 minutes a day to reap potent brain benefits.

Train your brain. Your brain consists of a vast network of billions of neurons connected by trillions of synapses. Every task you perform stimulates this network. When you perform novel or challenging tasks such as learning a new language, playing chess, solving puzzles and even intricate physical tasks like ballroom dancing, you engage new pathways, stimulate neurogenesis and build what you could call a cognitive reserve. Challenge and exercise your brain daily to delay the onset of and/or reduce the impact of age related mental acuity decline.

gene. The more minor variations of these genes they carried, the greater their risk of decreased cognitive function, especially regarding memory and perceptual speed. Other research shows that the interaction of BDNF with another genotype (APOE4) increases the likelihood and magnitude of mental acuity decline.

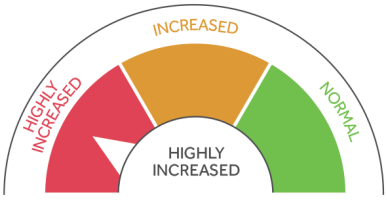
It can be scary to hear that you're at a higher risk for mental acuity decline. Remember, however, that gene science is still relatively very young and there are a great many factors that impact your brain health and cognitive functioning beyond genetic predisposition. Likewise, there are myriad steps you can take to help maintain healthy brain function as you age. Knowing that you may be at above average risk genetically gives you time to take those steps early to protect your brain later in life.

Our analysis investigated which genotype for these genes was present in your DNA. Your rating of LOWER, SLIGHTLY ABOVE AVERAGE, or ABOVE AVERAGE reflects whether your genotypes included those that carried a risk for more or less mental acuity decline with age.

AGE RELATED HEARING LOSS

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that give you HIGHLY INCREASED risk for age-related hearing loss. That means your hereditary risk for hearing loss is significantly higher than normal. That's the bad news. The good news is that one-third of permanent hearing damage is preventable and there are many steps you can take right now to protect your ear health, minimize your loss and maintain hearing throughout your lifespan.



Your genetic profile indicates that you have a HIGHLY INCREASED risk for age-related hearing loss

You can minimize your risk starting now by taking 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

We are all at risk for some hearing decline over time, regardless of genetic makeup. As someone who is at a significantly increased risk genetically, it's important to make protecting your hearing and ear health high priority.

Quiet your environment. Your house and yard can be surprisingly noisy places. Appliances like hair dryers, coffee grinders and blenders all send out elevated decibel levels. Anything noisy enough to be uncomfortable is noisy enough to damage your hearing. Keep the hair dryer set on the lowest setting and wrap a dishtowel around the base of blenders and coffee grinders to muffle the noise.

Wear hearing protection. It's prudent to avoid very loud environments such as rock concerts, motorsports events and being around heavy machinery like lawn mowers, power saws and leaf blowers as much as possible. When you can't, protect your ears. Earplugs or earmuffs can reduce noise by a hearing protecting 30 decibels.

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.

FUNCTION

AGE RELATED HEARING LOSS

Pull the earbuds. Wearing earbuds can increase your risk for hearing damage because the sound is going directly into your ears and we often turn them up to a volume loud enough to block out outside noise. People at increased risk for hearing loss should avoid earbuds. Or, if you must wear them, keep the volume set to 60 percent of maximum or below and limit use to no more than 60 minutes a day.

Manage heart disease and diabetes. Diseases like diabetes, high blood pressure and heart disease impact blood supply to your ears and can increase your hearing loss risk. Control your blood pressure and manage your insulin to help maintain healthy ear function.

Get regular checkups. Hearing slips away so gradually with age-related hearing loss that many people don't realize it's happening until they've suffered significant loss. Ask to have 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.

Beware ototoxic drugs. There are about 200 drugs that have the potential to damage hearing, including antibiotics and high doses of aspirin. Consult with your doctor about any current or new medications so you can work to find an alternative medication and/ or take other measures to minimize potential damage.

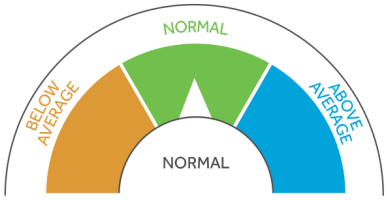
Know the signs. Be alert to signs of hearing loss and see your doctor as soon as you notice them. Changes to be on the watch for include ringing in your ears, trouble hearing conversations, inability to hear high-pitched sounds and/or having difficult hearing over the phone.

FUNCTION

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

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.

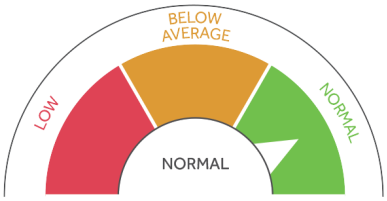
A growing body of research on thousands of the "oldest of the old," those in their 90s and 100s, show that these two genes and their alleles are strongly associated with one's likelihood for extreme longevity, while other gene mutations appear to reduce that likelihood by up to 50 percent. Interestingly, 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 NORMAL fitness response to high-intensity exercise. That means you can expect to experience optimal cardiovascular benefits when you push yourself to higher intensities during cardio workouts.



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

You are likely to experience improved cardiovascular fitness from high-intensity cardio. We recommend incorporating bouts of hard efforts in your exercise routine to maximize your genetic potential. Also include resistance training for optimal fitness.

SUCCESS STRATEGIES

You get fitness gains from all exercise, but research shows that working at higher intensities can bring even greater benefits in the form of improving metabolism and increasing your VO2 max. Your genotype makes you primed to reap the benefits of high intensity exercise.

Try incorporating High Intensity Interval Training (HIIT) into your weekly routine. To do it, warm up with your usual cardio. Then push the effort hard for 30 to 60 seconds. Reduce the effort level to recover for a minute or two and repeat 4 to 6 times. HIIT workouts are like strong medicine. A little goes a long way. One to two bouts a week is all you need and give yourself a day of to regenerate between bouts.

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

FUNCTION

FITNESS RESPONSE TO CARDIO

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

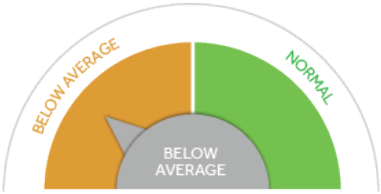
In general, your VO2 Max improves with moderate to high intensity exercise. How much it improves depends on many factors including your size, gender and as scientists now know, your genes. When researchers had sedentary men and women begin an exercise routine that included up to 50 minutes of cardio 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 factor for CRP levels. Carrying excess fat, particularly around

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 Follow up

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.

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 your skin's attempt to protect itself from further damage, it does not mean that good tanners the blood. According to the American Heart Association, you are at a low risk

FUNCTION

SYSTEMIC INFLAMMATION

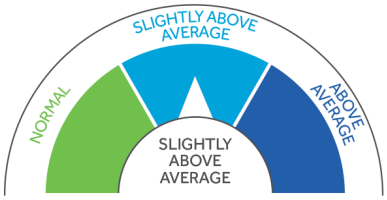
for developing heart disease if your CRP levels are less than 1.0 mg/L; your risk is considered average if your levels are between 1.0 mg/L and 3.0 mg/L, and your risk is high if your levels are higher than 3.0mg/L.

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 SLIGHTLY ABOVE AVERAGE PUFA blood levels. Your genetic profile indicates that your body is likely efficient in converting and metabolizing the fatty acids you need. That's good news because there's a strong link between cardiovascular health and lower mortality and adequate levels of these essential fatty acids in the blood. It's still important to eat a PUFA-rich diet so you maintain healthy adequate levels of these protective essential fatty acids.



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

We recommend that you continue to eat PUFA-rich foods—especially in lieu of those that are high in saturated fats or simple carbohydrates—to maintain your PUFA blood levels, which can help lower your cholesterol and coronary artery and heart disease risk.

SUCCESS STRATEGIES

A tall and growing body of research indicates that the healthiest, longest living people on the planet follow PUFA-rich diets such as the much-hailed Mediterranean diet, as well as the Japanese diet, which has recently been found to reduce the risk of mortality from all causes by 15 percent among those who follow it most closely. It appears especially good at decreasing risk for heart disease and stroke. Not surprisingly, the diet, which contains ample amounts of fish, soy foods and vegetables, is also rich in 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 maintain healthy levels

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 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.

POLYUNSATURATED FATTY ACID TENDENCY

by eating more nuts and seeds; swapping soy foods for animal protein at some meals and using olive, walnut and/or canola oil for drizzling on salads and side dishes. The US government also recommends increasing intake of foods rich in omega-3 fatty acids to balance omega-6/omega-3 fatty acids. Strive to eat 8 ounces of fish each week or increasing consumption of flaxseed, walnuts, Brussels sprouts or cauliflower or to improve levels of protective omega-3 fatty acids.

You should still avoid processed foods that are made with vegetable oils, as they not only tend to be low in nutritional value, but also PUFAs can be oxidized during processing, which may make them more harmful than healthful.

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.

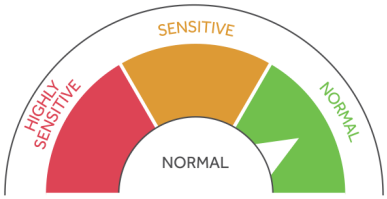
The level of these essential PUFAs in your bloodstream is largely determined by what you eat because your body cannot make its own. There is also some genetic influence to blood PUFA levels. Large scale meta-analysis gene studies have found a strong link between variations of the FADS1-2 genes and concentrations 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 blood lipid 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 NEUTRAL insulin response to consuming dietary fat. That means you can expect to have a positive insulin response following a calorie-restricted diet regardless of fat content. 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 NEUTRAL insulin response to consuming dietary fat.

You are likely to have a healthy insulin response and blood sugar levels whether eating low or higher fat. That means you may experience more positive insulin sensitivity (and less insulin resistance) by eating a typical, healthy diet with moderate amounts of fat. The types of fat you choose still matter for insulin sensitivity and overall health, however, as do your carbohydrate choices.

Your genetic profile indicates that you have a neutral insulin response to consuming dietary fat. Following a more moderate fat diet that gets about 30% of its calories from fat will help you maintain healthy insulin sensitivity and blood sugar levels. Carbohydrates also play a major role in insulin response, so it is important to choose complex, healthier carbohydrates.

SUCCESS STRATEGIES

The beauty of a moderate fat diet is that it is easy to do. You can pretty much eat what you want so long as you eat appropriate portions. That being said, research shows that unsaturated fats, particularly monounsaturated fats and polyunsaturated omega-3 fatty acids like those found in olive oil and fatty fish have a more positive influence on insulin response than saturated fats, like those found in meats (see Types of Fat in Blood Lipid Response to Dietary Fat section for more on types of fats). So you would still be wise to skew your intake toward the healthier end of the fat spectrum. These swaps

RELATED GENES / SNPs

FTO, PPM1K

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

INSULIN RESPONSE TO DIETARY FAT

can help:

- Use olive oil instead of butter when cooking.
- Eat fish or seafood at least twice a week.
- Go meatless Monday (and maybe Tuesday). Try bean and grain dishes and meat substitutes instead.
- Choose dark chocolate, which contains healthy fats, for a sweet treat and/or dessert instead of sugary cakes and cookies.

Be choosy about your carbohydrates. Dietary fat has a lot of influence, but the carbs you eat are still very much key to maintaining healthy insulin response and blood sugar levels. A whole potato will always trump a potato chip in the health department. Avoid sugary, starchy refined carbohydrates, which can spike your insulin and set you up for insulin resistance overtime, and opt for slower digesting complex carbs. Good sources include whole plant foods such as fruits, vegetables, legumes, whole grains (such as brown rice, quinoa and oats), nuts and seeds.

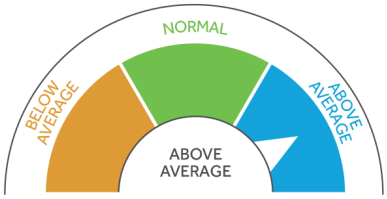
In a study published in The Journal of Nutrition, Boston-based researchers genotyped FTO (the gene associated with fat mass and obesity) variants among 743 overweight or obese men and women who were following either a high fat (40% of total calories) or a low fat (20% of total calories) diet for two 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 NEUTRAL, NOT SENSITIVE or 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 an ABOVE AVERAGE triglyceride response to cardiovascular exercise. That means you are likely to see your levels of these harmful blood fats drop significantly in response to regular aerobic exercise training. That's good news, as you will be rewarded for adhering to a regular exercise routine that includes at least 30 minutes of physical activity a day.



Your genetic profile indicates that you have an ABOVE AVERAGE triglyceride response to regular cardiovascular exercise.

If a blood test shows your triglyceride levels are elevated, starting and maintaining a regular exercise plan can help you bring these potentially harmful blood fats down to healthy levels.

SUCCESS STRATEGIES

The suggested level of exercise—at least 150 minutes per week of moderate cardio like walking, swimming and biking at a pace where you can easily converse—is effective for lowering triglyceride levels in people with your genotype. You may get an even bigger blood health boost by adding a few additional exercise and lifestyle modifications.

Amp it up. Vigorous exercise where you push the pace hard enough to huff and puff a little (e.g. you can only speak in short sentences) may yield even greater heart benefits and has been shown to help oxidize blood fats even better than easier activity. You can reap benefits from just 75 minutes a week in lieu of moderate activity, or even better, mix them up. Add a few intervals— short 5 to 10 minute bursts—of harder effort into your regular workouts once or twice a week.

Opt for healthy fats and carbs. All the exercise in the world does little good if it's not followed with a healthy diet. If your triglyceride levels are high despite

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 fat to fuel

TRIGLYCERIDE RESPONSE TO CARDIO

maintaining a regular exercise routine, look at what you're eating. Foods made with refined flour and sugar raise triglycerides. Limit those in your diet. Also swap foods with saturated fat like meats for those that are high in unsaturated fats—particularly monounsaturated fats like those found in olive oil, nuts, and avocados. Omega-3 fatty acids found in fatty fish are particularly good for lowering triglyceride levels. Aim to eat fish twice a week.

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.

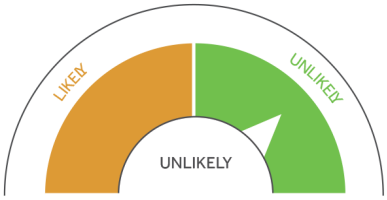
In fact, in a study of 478 men and women who were put on a 20-week endurance training program, variations of these four genes statistically explained 100% of the genetic effect of triglycerides' response to cardiovascular exercise. The good news is that, on average, triglyceride levels decreased over 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

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

LACTOSE INTOLERANCE

sun when 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.

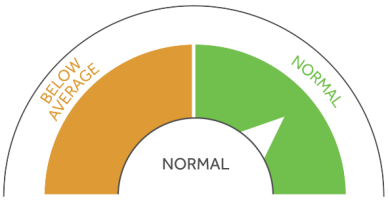
Our analysis investigated which genotype for this gene was present in your DNA. Your rating of LIKELY or UNLIKELY reflects whether or not your genotype included those that carried a risk for becoming lactose intolerant.

FUNCTION

CALCIUM TENDENCY

WHAT YOUR GENES SAY ABOUT YOU:

Our analysis indicates that your genetic profile exhibits characteristics that ma e you likely to have NORMAL blood levels of calcium. That means you likely have adequate circulating calcium in your bloodstream so your body doesn't have to leech it from your bones to maintain healthy cellular function. You should continue getting 1,000 mg (men) to 1,200 mg (women) of calcium a day through a vitamin and mineral-rich diet



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

Continue eating a healthy diet and maximize your skeletal health with bone-building lifestyle and exercise habits.

SUCCESS STRATEGIES

Our bodies become less adept at absorbing calcium as we age, so it's important to continue eating a diet that is rich in this essential mineral as well as to perform healthy lifestyle practices to keep your skeleton strong.

Consume more calcium. Some food sources of calcium are dairy, canned fis like salmon and sardines, tofu, almonds and fortified altern tive milk products., as well as collard greens, kale and spinach.

Skip supplements. Calcium supplements have been the topic of considerable controversy in recent years. Some research finds that th y are not useful for preventing fractures and may be linked to increase risk for heart disease. You can get plenty of calcium in your diet and your genotype does not call for additional amounts.

Stay active. Be sure to get regular "impact" exercise like jogging, tennis, or strength training. Your bones need some stress to get the signal to grow. Every time you load or add resistance to your bones, they release calcium into your blood. That calcium is then circulated and sent back to your bones which

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 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 cell 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.

Your calcium levels are influenced by your diet, how well your intestines absorb the

CALCIUM TENDENCY

then grow and become stronger. So these activities help keep them strong. Strength training two or three days a week has also been shown in studies to help build and maintain bone density.

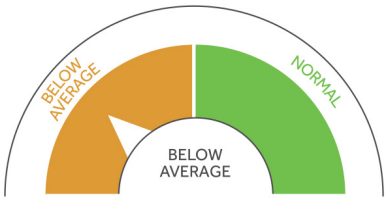
calcium you take in, levels of phosphate in the body, your vitamin D levels and by levels of certain hormones like parathyroid hormone, calcitonin and estrogen. Emerging research also shows that your genotype may influence blood calcium levels. In one very large study of 39,400 men and women, researchers 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.

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 semisweetened 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.

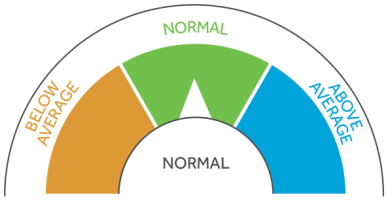
In one widespread analysis of more than 12,000 adults, genetic variations accounted for 5 percent of variation in blood copper levels. That's a small percentage, but can be significant when considering a trace mineral. Surveys also suggest that while true deficiency isn't common, many people don't get 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.

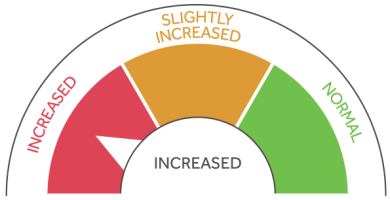
In one study of 15,366 men and women, researchers identified six gene variations that were associated with blood magnesium levels. These findings echoed those of another study that found these gene associations in both Caucasian and African American populations. The effects were most pronounced in postmenopausal 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 give 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 levels 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. Soy milk 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, you may want to consider taking a choline supplement to ensure you reach your adequate intake.

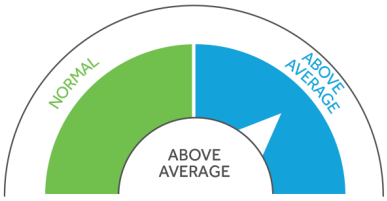
A study published in 2009 in Nutrition Reviews reported that the average choline intake among men and women is below Adequate Intake. Women appear most likely to fall short. Though some people will not develop adverse symptoms from eating a low choline diet, certain genetic variations (specifically carrying 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 leave them susceptible to choline deficiency. 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:

Your genetic profile indicates that you are likely to have ABOVE AVERAGE blood levels of selenium. That's generally good news because selenium plays a key role in many critical biological processes including immunity, reproduction, thyroid function and general cellular function. Though uncommon, it's possible to get too much of this essential mineral, which can lead to selenium toxicity. As someone who is genetically prone to above average levels, there's no need to supplement your diet with additional selenium.



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

We recommend that you continue to maintain healthy levels of this essential mineral by eating a diet rich in grains, fish, lean meats and vegetables, while being mindful of not going overboard with very high selenium foods.

SUCCESS STRATEGIES

The average daily selenium intake among Americans is 108.5 mcg, according to the National Health and Nutrition Examination Survey (NHANES). So most of us get more than enough through our daily diet and there is no need to supplement.

People who are genetically inclined to above average selenium levels should approach very high selenium foods, especially Brazil nuts, with a measure of caution. Just one ounce (about 6 to 8 nuts) of Brazil nuts delivers a whopping 544 micrograms of selenium, so eating them often could easily result in toxicity, which causes brittle hair and nails, as well as nausea, diarrhea, rashes, fatigue and irritability.

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 most

FUNCTION

SELENIUM TENDENCY

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.

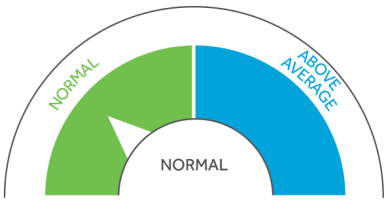
In one widespread analysis of more than 12,000 adults, genetic variations accounted for four percent of variation in blood selenium levels with minor alleles at this SNP increasing the average blood levels. That's a small percentage, but can be significant when considering a trace mineral. It's also 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 NORMAL blood zinc levels. That's good news because adequate levels of zinc help keep your immunity strong and can help protect you from both acute diseases like colds and infections as well as chronic conditions like heart disease and diabetes. Remember that genetics play just one role in your blood level zinc status and its still important to get enough of this essential mineral in your daily diet, especially if you're among the groups, like older adults and vegetarians, who may have a tendency to have a lower than adequate daily zinc intake.



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

We recommend eating a diet rich in foods that are good sources of this essential mineral to continue getting the minimum 8 to 11 mg of zinc you need each day to maintain the zinc blood levels you need for strong immunity and healthy cellular function.

SUCCESS STRATEGIES

Since our bodies don't store zinc, we need to eat adequate amounts in our diet every day. Most Americans do. However, a sizable percentage of the population falls short. National nutritional surveys show that up to 45 percent of adults over the age of 60 fall below the recommended amount. Vegetarians and vegans are also at risk for marginal amounts because zinc found in plant foods is harder for the body to absorb. In fact, some experts recommend that vegetarians aim to get 50% more zinc than the recommended dietary allowance to ensure their body gets the amounts it needs. For meat eaters, getting adequate amounts of zinc is easy, especially if you also like shellfish. Just three ounces of oysters delivers 74 mg, far and away more than any other food source. Other zinc-rich foods include lobster, crab, pork and chicken (dark meat especially). Zinc is also found in yogurt, baked beans, cashews, oatmeal, milk, kidney beans, almonds, chickpeas and fortified.

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. Though outright deficiency is uncommon in industrialized

FUNCTION

ZINC TENDENCY

If you eat little or no meat, consider taking a multivitamin as a form of insurance for days when your diet may fall short. Getting zinc in a multivitamin is preferable to taking it alone, as too much zinc on its own can cause copper levels to drop. Multivitamins contain the right balance of both.

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. Upper limits for intake are 34 mg for women and 40 mg for men.

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:

LOOK - SUN SENSITIVITY

Hum Mol Genet. 2001 Aug 1;10(16):1701-8. doi: 10.1093/hmg/10.16.1701. PMID: 11487574.

The melanocortin-1-receptor gene is the major freckle gene

https://pubmed.ncbi.nlm.nih.gov/11487574

Bastiaens M, ter Huurne J, Gruis N, et al.

PLoS Genet. 2008 May 16;4(5):e1000074. doi: 10.1371/journal.pgen.1000074. PMID: 18483556; PMCID: PMC2367449.

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

https://pubmed.ncbi.nlm.nih.gov/18483556

Han J, Kraft P, Nan H, et al.

J Invest Dermatol. 2009 Sep;129(9):2250-7. doi: 10.1038/jid.2009.62. Epub 2009 Apr 2. PMID: 19340012; PMCID: PMC2758927.

Genome-wide association study of tanning phenotype in a population of European ancestry

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