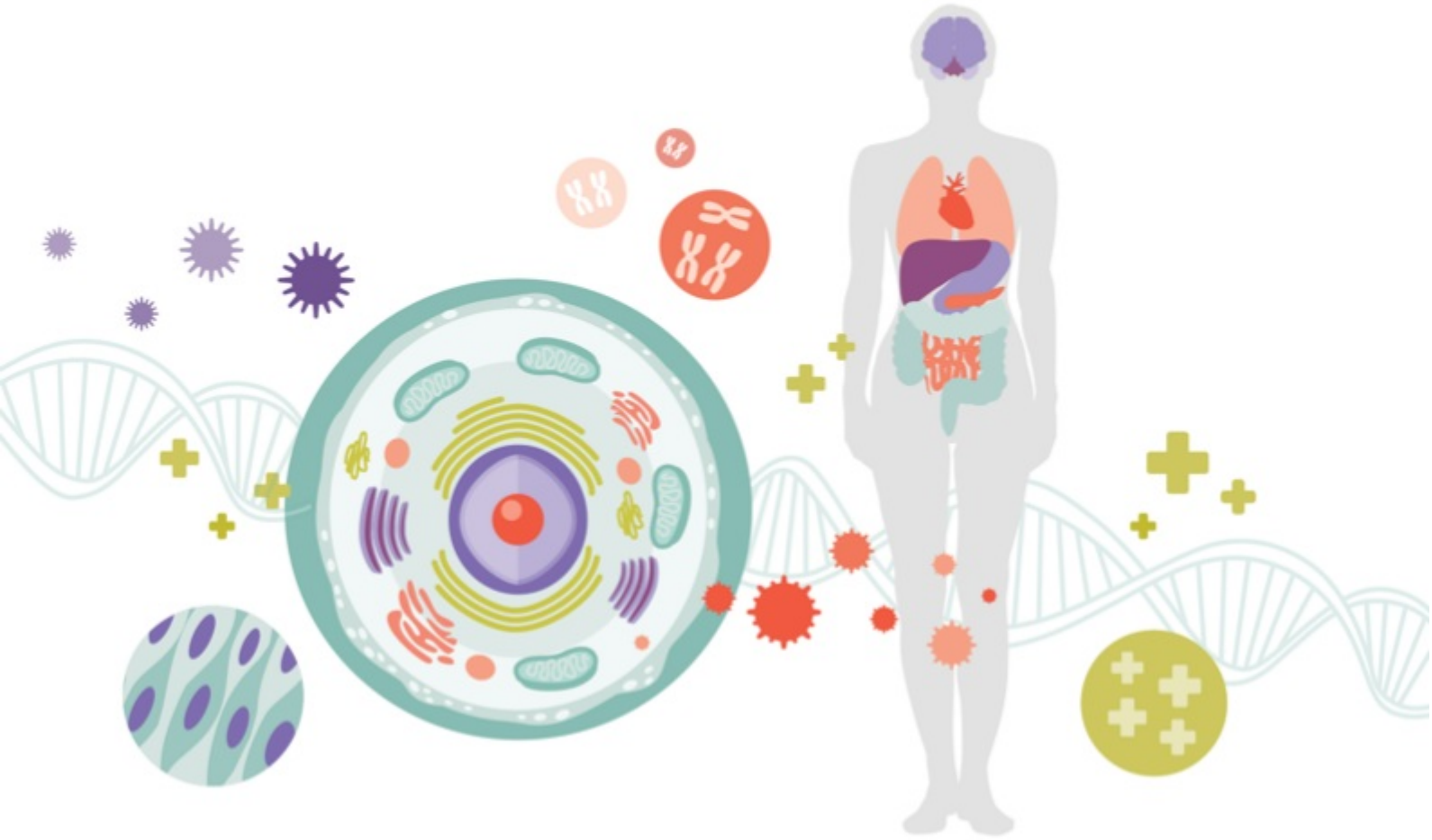
3x4 GENETICS



THE PERSONAL GENETIC STORY OF

HUGH RAYE

Blueprint version 3.1

INTRODUCTION

The journey to taking control of your health begins with understanding your body

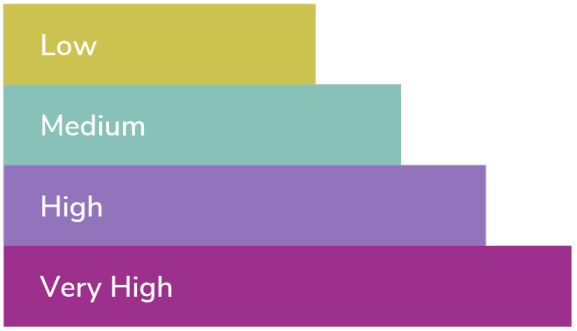
Your genes are the basic instructions for your body. Which begs the question: How well do you know your genes? Understanding your individual genetic blueprint can guide you to make health choices that may help you to live a happier, longer and better life.

Can we change our genetic destiny?

The old idea that genes are “set in stone” has been disproven. The genetic code we are born with cannot be changed. But how that genetic code is expressed, can. We are the product of the interaction of our genes with the choices we make in our environment. Our DNA is the floor plan, but our daily decisions build the house. Every health choice you make can and should be personalized for you and your unique body.

The Language of Color

We have used color-coding in your 3X4 Blueprint to help you discover the most potentially impactful genes and pathways in your results and what research suggests may be the most effective diet and lifestyle changes you can make. Each pathway is color-coded from a dark purple (highest impact on your health) to light green (lowest impact on your health) to help you know where to start and what to focus on.



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YOUR 3X4 SUMMARY PLAN

Hugh Raye

Welcome to your personalized 3X4 plan. We have identified the top 3 most potentially significant pathways where you will likely see the biggest impact to your health, based on your unique genetic profile. For each pathway, we provide three recommended diet and lifestyle interventions and three supplement suggestions to choose from.

Consult a healthcare practitioner who will use these recommendations in combination with your current diet, lifestyle, medical conditions, medical history, family history, and environmental exposures to build a complete picture of where you are now and a plan for how to move forward, resulting in practical and personalized recommendations that guide you on your journey to making health a daily choice.

METHYLATION — VERY HIGH

Methylation is the biochemical process of making sure every cell is functioning optimally. Methylation is not just responsible for how we repair genetic material, but also how we make energy, respond to stress, handle inflammation, how well our cells detoxify, and how our brain chemistry works. Methylation is the process involved in actually turning genes on or off. We may be able to reduce our risk of developing certain diseases and some types of cancers by optimizing methylation.

1. Focus on foods high in B-complex vitamins, magnesium and choline by eating 3-4 servings of a combination of leafy and cruciferous vegetables (raw), avocados, citrus fruits, legumes, poultry, eggs, nuts, and seeds.
2. Eat quality proteins with essential building blocks for methylation and foods rich in vitamin B12, methionine and betaine like wild caught fish, organic poultry, grass-fed meats or wild game, garbanzo beans and edamame.
3. Support toxin breakdown with cruciferous vegetables, green and black teas. Support B vitamin absorption with fermented foods, adequate fiber, and limit alcohol.

1. Use daily relaxation techniques to reduce exposure to stress hormones which may burden the methylation cycle e.g. meditation, yoga, Qi Gong and massages.
2. Intentionally limit exposure to substances that overload the methylation cycle including medication, alcohol and endocrine disruptors.
3. Avoid external toxins like pesticides, plastic packaging, Teflon cooking utensils, cleaning products, cosmetics and synthetic clothing. Also eliminate toxins that cause DNA damage e.g. heavy metals like arsenic, cadmium, lead, pesticides, and contaminated drinking water.

1. B vitamins including 5-MTHF (200-400mcg), Methyl-B12 (100mcg), vitamin B2, B3, and B6 (P5P).
2. Zinc (20-30mg) and Magnesium (250-500mg).
3. Sulforaphane from whole broccoli sprout powder yielding 20mg (or as recommended by a healthcare practitioner), choline and methionine.

OXIDATIVE STRESS — VERY HIGH

Oxidative stress is the human equivalent of rusting. The impact of all exposures over time results in damage to our cells. Unmanaged, oxidation can impact on our energy levels, memory, premature aging and sometimes cancer risk. In a healthy functioning cell, enzymes that counteract oxidative damage, a 'rust block' so to speak, are made. The ability to make those enzymes is determined by certain genes. However, a good diet and lifestyle can aid towards a lower oxidative burden and help maintain the health of your cells.

1. Consume 1-2 cups of whole plant foods e.g. dark leafy greens, chili peppers, olives, beetroot, pomegranate, berries and olive oil.
2. Eat foods rich in zinc, copper, selenium and manganese such as seeds, nuts, leafy greens and legumes.
3. Choose anti-inflammatory foods and spices rich in polyphenols and omega-3 such as cocoa, dark chocolate, berries, curcumin, black pepper, cardamom, cumin seeds and wild-caught fatty fish

1. Be aware that extensive endurance and high-intensity training increases the potential for oxidative stress. Manage training regime, and ensure recovery with rest and optimal nutrition.
2. Limit contact with strong pro-oxidants e.g. heavy metals, pesticides, mold, radiation, high dose iron and copper supplements. Long-term high dose oral vitamin C and E may interfere with the body's natural anti-oxidant response.
3. Regulate circadian rhythm by sleeping in a dark, cool environment for at least 7-8 hours per night. Limit exposure to electronic devices (blue light) before bed.

1. Coenzyme Q10 (Ubiquinol 300mg)
2. Alpha Lipoic Acid (500mg), Methylsulfonylmethane (MSM) (2-6g), Cantaloupe Melon extract rich in SOD e.g. GliSODin (6,6mg daily or as recommended)
3. Minerals such as zinc (30mg) and selenium (200mcg)

GLUCOSE & INSULIN — VERY HIGH

Our cells run on glucose, a simple sugar obtained from the food we eat. Our bodies work hard to ensure the amount of glucose in the blood is kept at just the right level. High blood glucose is often associated with weight issues and diabetes, but chronically elevated blood sugar also has other effects such as accelerated aging and chronic inflammation, which underlie every major chronic illness. Insulin is manufactured in the body and is used to regulate glucose levels. The way insulin and glucose do their job is determined by certain genes as well as by other factors such as our weight, diet, and lifestyle choices.

1. Avoid added sugar and processed carbohydrates; focus on whole grains, quality protein and 4-5 servings of medium-chain triglycerides (MCTs) and unsaturated fats (olives, nuts, seeds, avocado and coconut).
2. Support glucose and insulin hormone health with foods rich in Selenium, Chromium, vitamin A, resveratrol and flavonoids (sweet and hot peppers, red grapes, broccoli, carrots, sweet potato, brazil nuts, poultry, beef and lamb).
3. Support the gut microbiome to produce short chain fatty acids like butyrate. Include 30-50g of fiber from barley, oats, onions, squash, turnips, and other root vegetables. Also add fermented foods (kimchi, sauerkraut and kombucha).

1. Be aware of medications that affect CoQ10, B12 and Folate, and Chromium levels.
2. Improve insulin sensitivity by grazing less, intermittent fasting (12-13 hours each night), endurance and strength training.
3. Improve glucose balance by reducing stress exposures and utilizing relaxation techniques such as rhythmic breathing and meditation daily.

1. Curcumin (300-600mg), Berberine (500-1500mg), Resveratrol (200-300mg)
2. Thiamine (50-100mg), Niacin (50-100mg), Biotin (5-15mg), Chromium (100-150mcg), Vanadium (5-10mg)
3. Gymnema (50-200mg), Cinnamon (100-200mg), Banaba leaf (400mg), Fenugreek (200-300mg)

GENE SUMMARY

Hugh Raye

You will notice that some of the genes have a star ★ next to them. Based on your individual results, these genes have been identified as having a bigger impact on your pathways and individual health.

Gene	Variant	Result
PROTECTIVE		
BHMT	Arg239Glu G>A	GA
CYP1A2	–163 A>C	AA
TIMP4	–55 T>C	CT
NO IMPACT		
ACE2	A>G	AA
ADRB3	Trp64Arg T>C	TT
ALDH2	Glu504Lys G>A	GG
ANK3	A>G	AA
ANK3	318473 C>T	CC
APOA2	–492 T>C	TT
APOA5	–1131 T>C	TT
APOA5	C>A	CC
APOC3	3175 C>G	CC
APOE	E2/E3/E4	E3/E3
CACNA1C	G>A	GG
CHRNA5	Asp398Asn G>A	GG
CHRNA5	C>T	CC
CLOCK	3111 T>C	TT
COL1A1	1546 G>T	GG
COL3A1	Ala698Thr G>A	GA
CYP19A1	C>T	CC
CYP1A1	Ile462Val A>G	AA
CYP1B1	Asn453Ser A>G	AA
CYP2C19	*1/*2/*17	*1/*1
CYP2C9	Ile359Leu A>C	AA
CYP2D6	*1/*3/*10	*1/*1
CYP3A4	–392 A>G	AA
DAO	C>T	CC
DAO	His645Asp C>G	CC
DRD1	–94 G>A	GG
DRD2	TaqIA C>T	CC
EPHX1	Tyr113His T>C	TT
F2	20210 G>A	GG
F5	Arg506Gln G>A	GG
FAAH	Pro129Thr C>A	CC
FABP2	Ala54Thr G>A	GG
FADS2	C>G	CC
FOXO1	A>G	AA

Gene	Variant	Result
NO IMPACT		
FOXO3	G>T	GT
FUT2	Trp153Ter G>A	GA
GABRA2	Lys132Lys A>G	AA
GSTO2	Asn142Asp A>G	AA
GSTP1	Ile105Val A>G	AA
GSTP1	Ala114Val C>T	CC
GSTT1	INS/DEL	INS
HFE	C282Y/H63D	CC/HH
HLA	DQ 2.2/2.5/8	DQ2.2/DQ2.2
HPA-1	T>C	TT
HTR1A	–1019 C>G	CC
LEPR	Gln223Arg A>G	AA
MC4R	T>C	TT
MMP1	–1607 1G/2G	1G/1G
MMP3	A>G	AG
NAT1	Arg187Gln G>A	GG
NOS3	–786 T>C	CC
NRF2	A>G	AA
OGG1	Ser326Cys C>G	CC
OPRM1	Asn40Asp A>G	AA
SHBG	Pro185Leu C>T	CC
SHBG	–68 G>A	GG
SLC23A1	790 G>A	GG
SLC2A2	Thr110Ile C>T	CC
SRD5A1	A>G	AA
SULT1A1	Arg213His G>A	GG
TNFA	–238 G>A	GG
UCP1	–3826 A>G	AA
UCP2	–866 G>A	GG
UCP3	–55 C>T	CC
UGT2B15	T>G	GG
UGT2B17	INS/DEL	INS
VDR	Fok1 T>C	CC
VDR	Taq1 T>C	TC
VEGF	–634 G>C	GG
LOW		
ACSL1	T>C	TC
ACVR1B	A>G	AG

GENE SUMMARY

Hugh
Raye

LOW

Gene	Variant	Result
ADIPOQ	–395 G>A	GA
ADRB2	Arg16Gly A>G	AG
ADRB2	Gln27Glu C>G	CG
AGT	Met235Thr A>G	AG
AKT1	G1172+23A T>C	TC
BDNF	Val66Met G>A	GA
CBS	699 C>T	CT
CETP	G>A	GA
CETP	Taq1B G>A	GA
CYP17A1	34 T>C	TC
CYP2C9	Arg144Cys C>T	CT
DIO2	Thr92Ala T>C	TC
FADS1	592 G>T	GT
GC	A>C	AC
GPX1	Pro198Leu C>T	CT
HNMT	939 A>G	AG
HO-1	–413 A>T	AT
IL-6R	Asp358Ala A>C	AC
IRS1	C>T	CT
LEPR	Lys656Asn G>C	GC
LPL	Ser474Ter C>G	CG
MTHFD1	1958 G>A	GA
MTRR	66 A>G	AG
NBPF3	T>C	TC
OXTR	A>G	AG
PEMT	–744 G>C	GC
PLIN	11482 G>A	GA
PON1	Gln192Arg A>G	AG
PPARD	294 T>C	TC
TAS2R38	Ala262Val C>T	CT
TNFA	–308 G>A	GA
VDR	Bsm1 G>A	GA

MEDIUM

Gene	Variant	Result
COMT	Val158Met G>A	GA
HNMT	Thr105Ile C>T	CT
MMP2	Gly226Gly G>C	CC
MTHFR	677 C>T	CT
MTHFR	1298 A>C	AC
MTR	2756 A>G	GG
NQO1	Pro187Ser C>T	CT
PPARA	89204 G>C	GG
SIRT1	994 T>C	TT

HIGH

Gene	Variant	Result
ACE2	7132 T>C	TT
ADIPOQ	–11391 G>A	GG
AMPD1	133 C>T	CC
CAT	–262 C>T	CC
CKM	NcoI T>C	TT
COL12A1	AluI A>G	AA
CRP	2147 G>A	GG
DRD1	–48 G>A	GA
DRD3	Ser9Gly T>C	CT
DRD4	–521 C>T	TT
ENOS	Glu298Asp G>T	TT
FUT2	Gly258Ser G>A	GA
HIF1A	Pro582Ser C>T	CC
IL-6	–174 G>C	GG
LEPR	Lys109Arg A>G	AA
NAT2	R/I/S	Slow
PPARG	Pro12Ala C>G	CC
VEGFA	-2578 C>A	AA

VERY HIGH

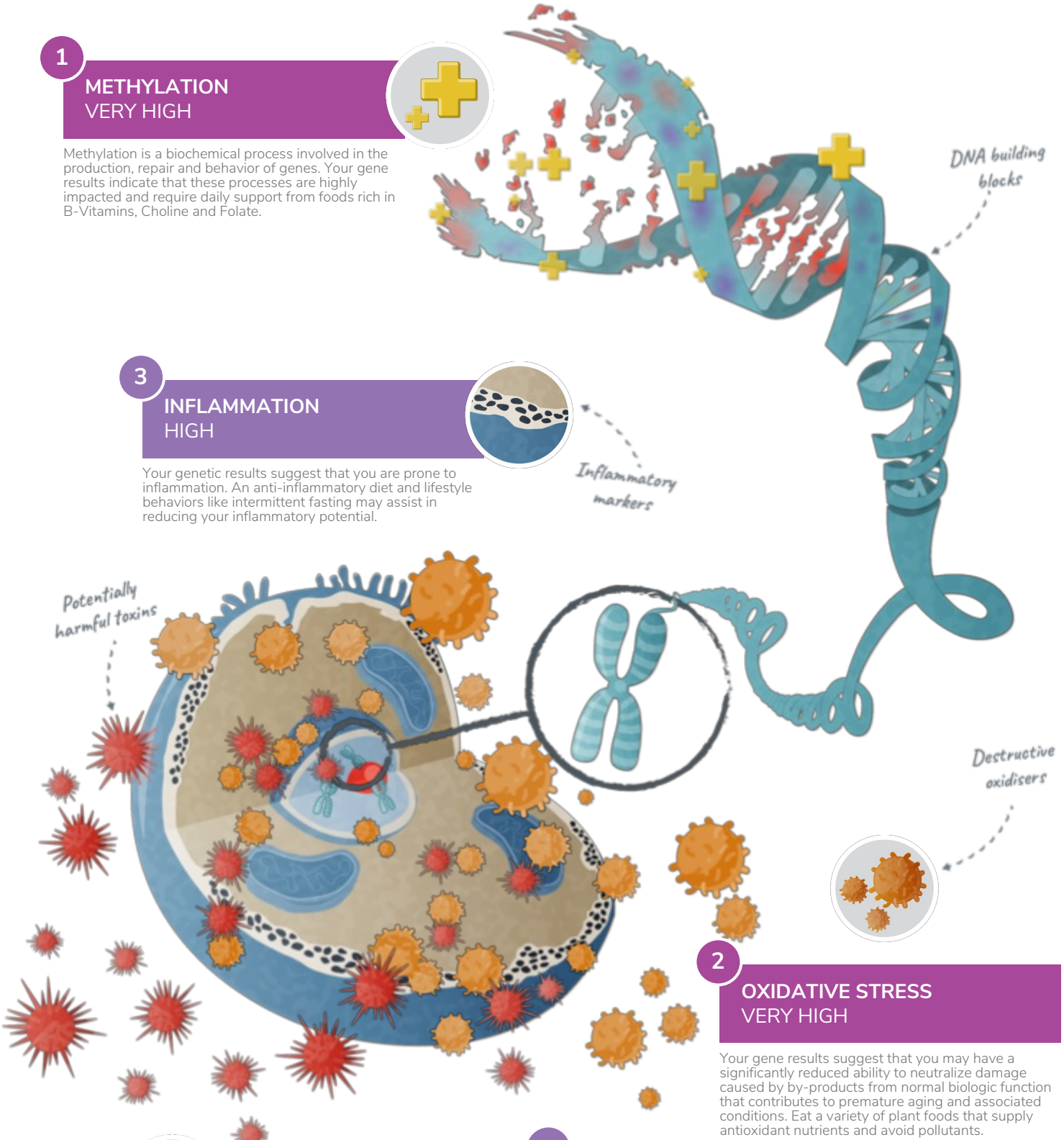
Gene	Variant	Result
★ ACE	Ins/Del	II
★ ACTN3	577 R/X	RR
CYP1B1	Leu432Val C>G	GG
CYP2R1	A>G	GG
FTO	87653 T>A	AA
GDF5	5'UTR C>T	TT
★ GSTM1	INS/DEL	DEL
IL-1	+/–	+
MAOA	Arg297Arg G>T	TT
MNSOD	Val16Ala T>C	TT
PPARGC1A	Gly482Ser G>A	GA
TCF7L2	IVS3 C>T	TT
★ TCN2	776 C>G	GG

PATHWAY-BASED RESULTS

	PATHWAY	IMPACT
CELLULAR	Methylation	VERY HIGH
	Oxidative stress	VERY HIGH
	Inflammation	HIGH
	Detoxification	HIGH
SYSTEMS	Glucose & insulin	VERY HIGH
	Memory & brain health	VERY HIGH
	Collagen & joints	HIGH
	Mood & behavior	HIGH
	Bone health	HIGH
	Hormone balance	MEDIUM
	Histamine overload	LOW
CARDIOVASCULAR HEALTH	Vascular health	MEDIUM
	Cholesterol	MEDIUM
	Blood pressure	MEDIUM
	Blood clotting	LOW
ENERGY	Pro-inflammatory fat	VERY HIGH
	Weight gain & weight loss resistance	VERY HIGH
	Adipogenesis	HIGH
	Exercise response	HIGH
	Energy expenditure	HIGH
	Appetite/Satiety/Intake	LOW
ACTIVITY	Training response	VERY HIGH
	Injury	VERY HIGH
	Endurance	HIGH
	Recovery	MEDIUM
	Power	LOW
NUTRIENTS	Vitamin B12	VERY HIGH
	Folate	HIGH
	Salt	MEDIUM
	Vitamin D	MEDIUM
	Choline	LOW
	Fatty acids	LOW
	Caffeine	LOW
	Vitamin C	LOW
	Gluten	LOW
	Iron overload	LOW

CELLULAR OVERVIEW

We are the sum of our cells, and we are only as healthy as they are. Every cell in your body functions independently - like a small apartment or office space inside a high-rise building - each unit takes care of its own day-to-day maintenance, but ultimately contributes to the overall success and functionality of the building as a whole. Similarly, every cell in your body has its own mechanisms in place to clean and protect it, as well as to maintain health for the whole body and all its organs.



1 METHYLATION
VERY HIGH

Methylation is a biochemical process involved in the production, repair and behavior of genes. Your gene results indicate that these processes are highly impacted and require daily support from foods rich in B-Vitamins, Choline and Folate.

3 INFLAMMATION
HIGH

Your genetic results suggest that you are prone to inflammation. An anti-inflammatory diet and lifestyle behaviors like intermittent fasting may assist in reducing your inflammatory potential.

2 OXIDATIVE STRESS
VERY HIGH

Your gene results suggest that you may have a significantly reduced ability to neutralize damage caused by by-products from normal biologic function that contributes to premature aging and associated conditions. Eat a variety of plant foods that supply antioxidant nutrients and avoid pollutants.

4 DETOXIFICATION
HIGH

★ GSTM1 DEL

Your genetic results indicate that you are likely to have a reduced ability to neutralize and remove toxins. Support all detoxification processes using food, supplements and lifestyle interventions. Limit toxin exposure from food additives and your environment.

SYSTEMS & CARDIOVASCULAR OVERVIEW

Inside your body at any given moment are several highly sophisticated systems operating at the same time to keep you alive, healthy and running smoothly. Think of the network inside you as being similar to a complex underground railroad system below a big city, where multiple separate but interconnected parts are meticulously being organized to keep everything on track, on schedule, and safe. If these orderly systems stopped working properly and began rail-crossing, there would quickly be widespread chaos, delays, and eventually a complete stand-still.

4 MOOD & BEHAVIOR
HIGH

Genes influence the creation and balance of chemicals in the brain that manage mood, anxiety, depression and related behaviors. Genetically, you may be susceptible to an imbalance. Nutrients like Zinc and B-vitamins are important.

2 MEMORY & BRAIN HEALTH
VERY HIGH

Your genetic results show that you are highly likely to lose flexibility in the brain; important for learning, processing, remembering and storing information. A healthy diet, exercise and brain games daily are advised.

7 HISTAMINE OVERLOAD
LOW

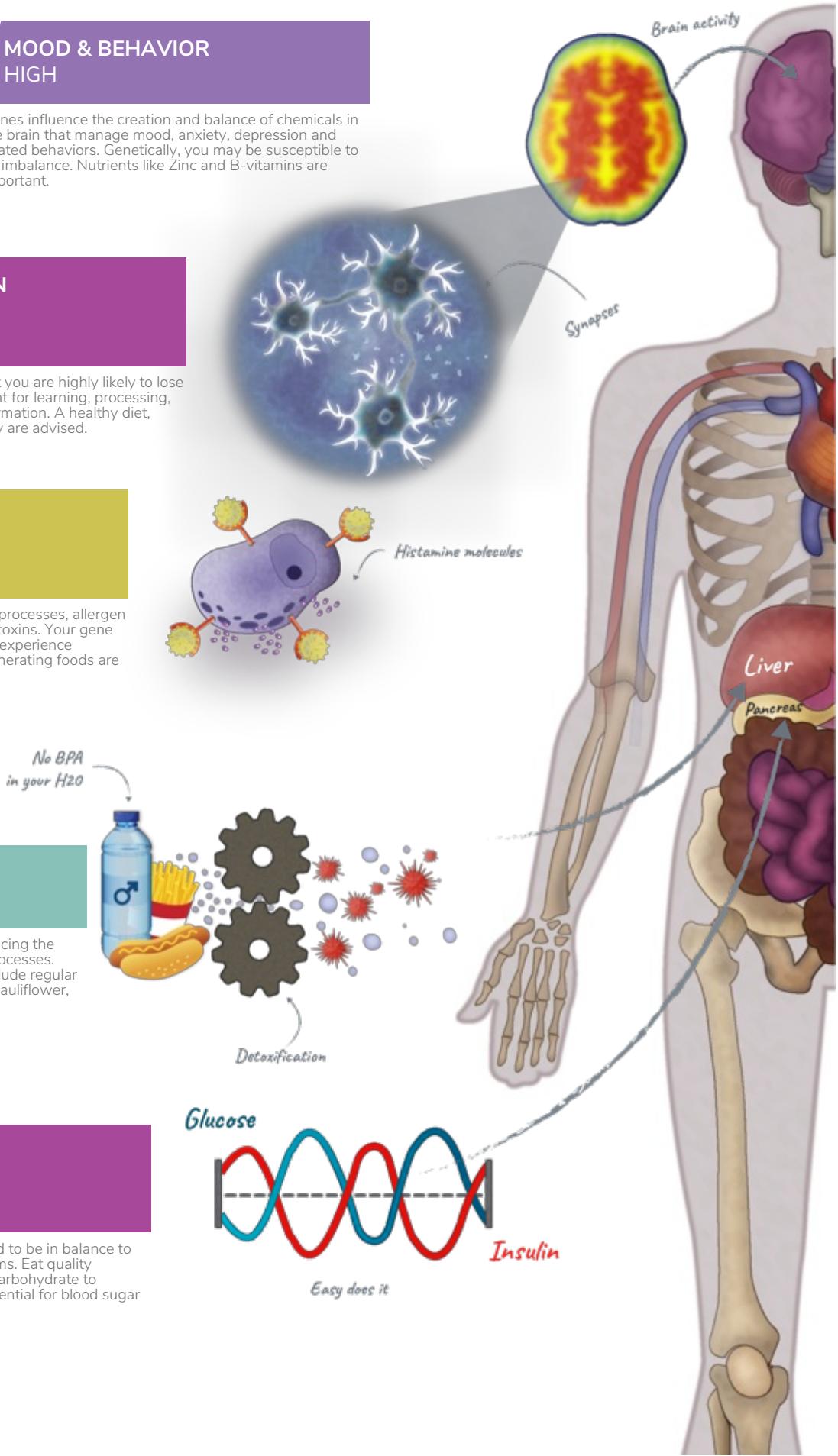
Histamine is produced during immune processes, allergen removal, and in response to injury and toxins. Your gene results indicate that you are unlikely to experience histamine overload when histamine generating foods are consumed.

6 HORMONE BALANCE
MEDIUM

Genetically, you may be less efficient at balancing the hormones required for male-related bodily processes. Manage stress and exposure to all toxins. Include regular servings of cruciferous vegetables (broccoli, cauliflower, etc.).

1 GLUCOSE & INSULIN
VERY HIGH

Glucose and insulin production need to be in balance to prevent damage to cells, and systems. Eat quality proteins, plant fats, and unrefined carbohydrate to support your significant genetic potential for blood sugar dysregulation.



4 CARDIOVASCULAR HEALTH

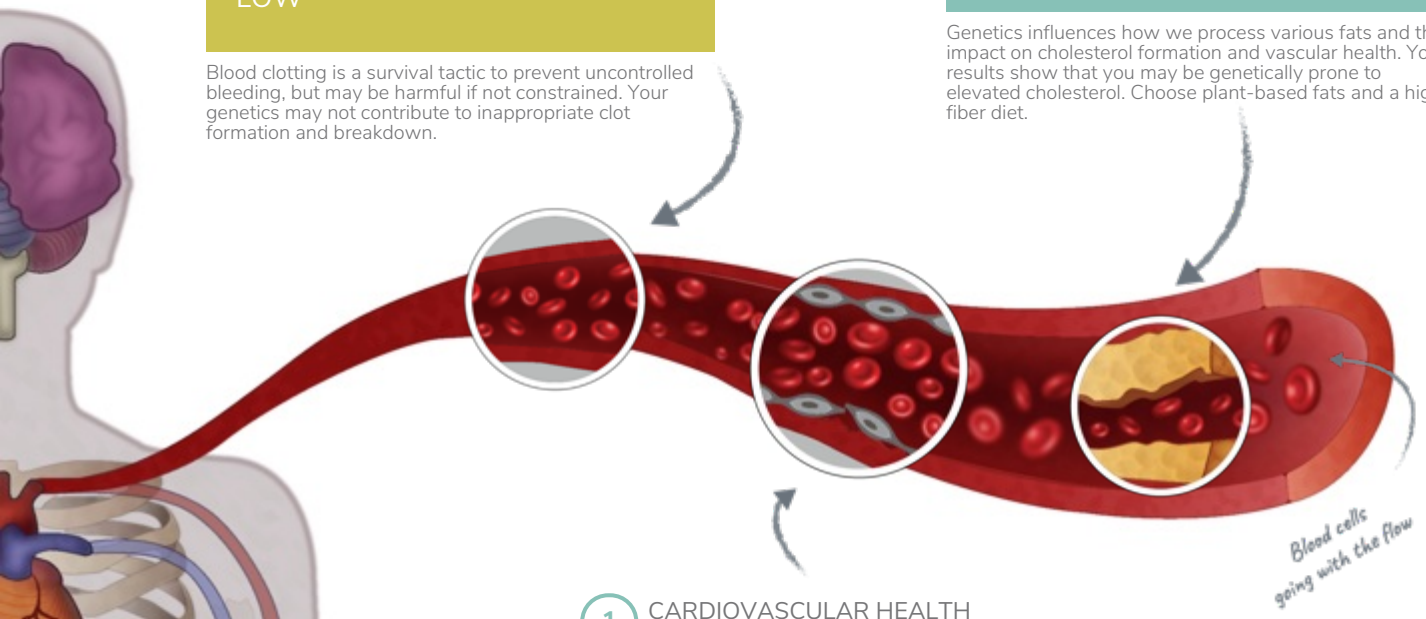
BLOOD CLOTTING
LOW

Blood clotting is a survival tactic to prevent uncontrolled bleeding, but may be harmful if not constrained. Your genetics may not contribute to inappropriate clot formation and breakdown.

2 CARDIOVASCULAR HEALTH

CHOLESTEROL
MEDIUM

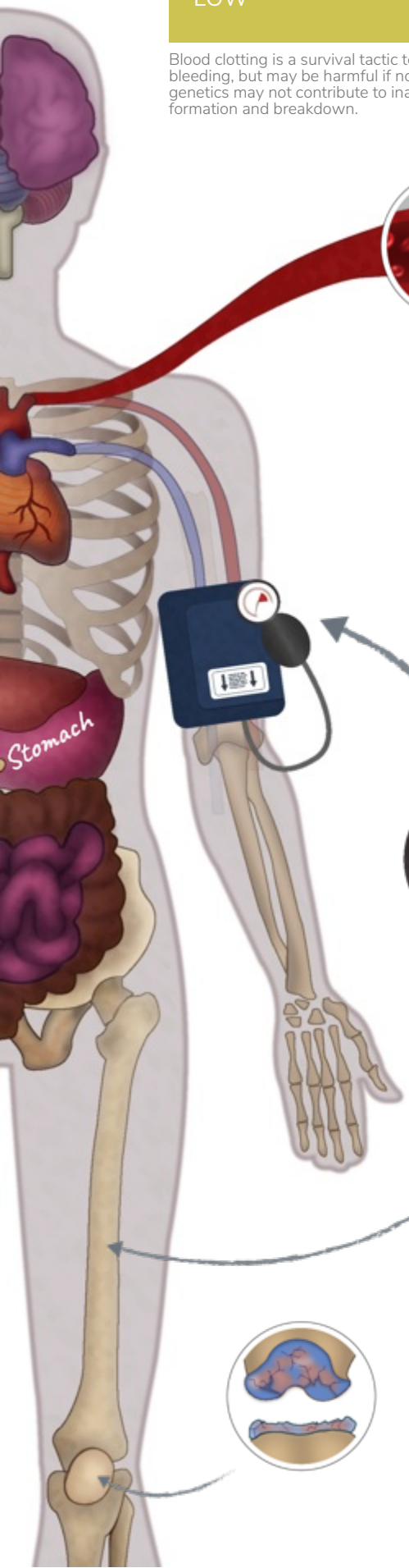
Genetics influences how we process various fats and their impact on cholesterol formation and vascular health. Your results show that you may be genetically prone to elevated cholesterol. Choose plant-based fats and a high-fiber diet.



1 CARDIOVASCULAR HEALTH

VASCULAR HEALTH
MEDIUM

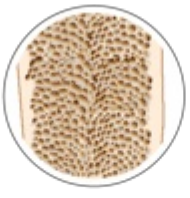
Genes impact the integrity of arteries and veins, affecting blood flow. Your results show that injury to your blood vessels may be partly due to genetics. A diet rich in polyphenols, stress management and exercise is advised.



3 CARDIOVASCULAR HEALTH

BLOOD PRESSURE
MEDIUM

High blood pressure is associated with damage to the artery wall and fluid retention within the blood vessel. Your genes may contribute to the development of high blood pressure. Diet and stress factors should be addressed.



5

BONE HEALTH
HIGH

Bone health refers to maintaining the balance between build-up and breakdown of bone tissue. Genetically, your bone turnover is impacted. It is important to include sunlight, minerals, vitamins D and K and exercise daily.

3

COLLAGEN & JOINTS
HIGH

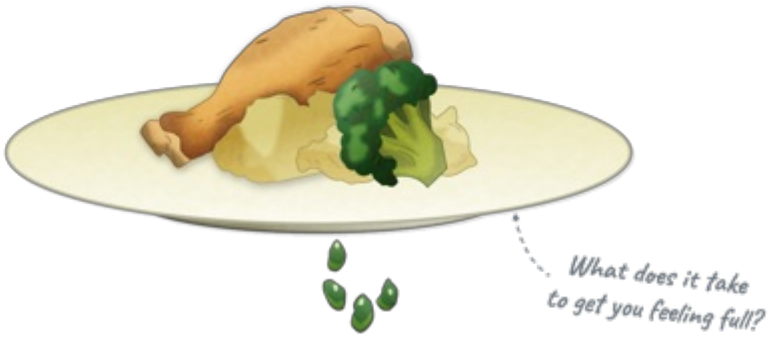
Connective tissue degeneration occurs when tissue breakdown in joints, ligaments, collagen, cartilage and skin, exceeds repair. Genetically, you are susceptible to damage. Eat adequate quality protein and micronutrients that support repair.

ENERGY OVERVIEW

Glucose is our main fuel source and what we make energy from. How we extract, absorb, burn, distribute, store and waste this fuel source varies between individuals, partly because of genetic variation. People respond very differently to calories, exercise, fasting, fatigue, etc. Hunger is also experienced very personally and with great variability. Knowing how you're hard-wired to handle fat, food, and fitness can save you a lot of frustration and, well...energy. These insights can be a powerful tool that enables you to work with your body, not against it, to finally reach your health goals.

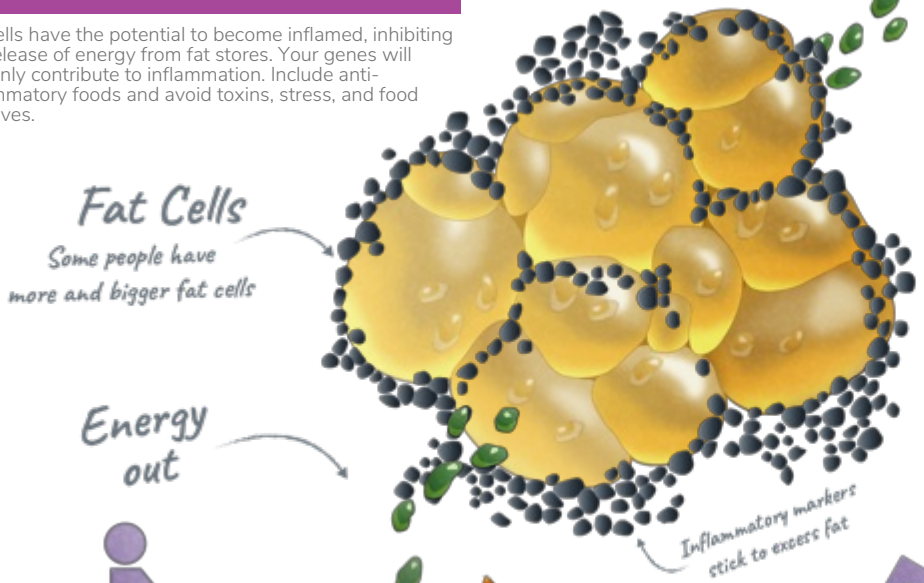
6 APPETITE/SATIETY/INTAKE
LOW

We all experience appetite, hunger, and fullness differently; this can affect our eating patterns and food choices. Your gene results do not appear to have a major influence on these processes.



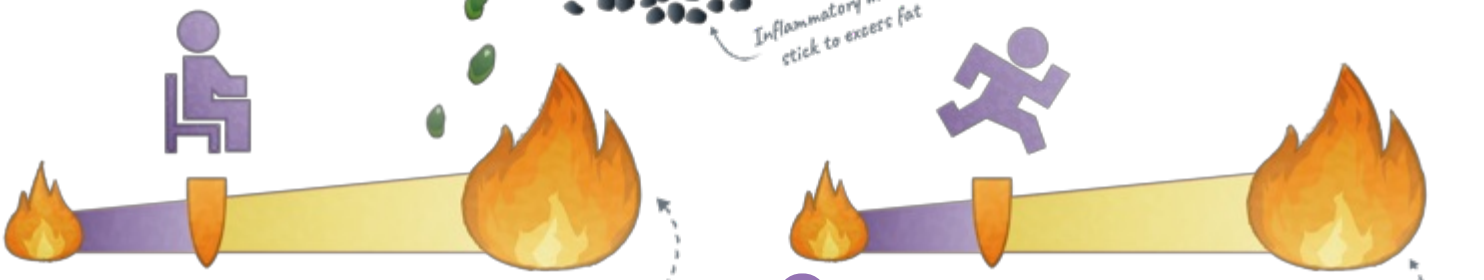
1 PRO-INFLAMMATORY FAT
VERY HIGH

Fat cells have the potential to become inflamed, inhibiting the release of energy from fat stores. Your genes will certainly contribute to inflammation. Include anti-inflammatory foods and avoid toxins, stress, and food additives.



3 ADIPOGENESIS
HIGH

The process by which you store fat and release energy impacts your fat loss ability. Your results suggest that you are resistant in releasing fat from stores. Intermittent fasting and regular exercise will support this process.



5 ENERGY EXPENDITURE
HIGH

Energy is needed for important functions such as breathing, digestion and activity. Your results indicate that your genes will likely reduce the efficiency of your metabolism. Choose nutrient-dense, low-energy foods and regular, intensive exercise.

4 EXERCISE RESPONSE
HIGH

The ability to mobilize and release stored energy during exercise varies. Genetically, you may be inefficient at releasing energy in response to activity. A nutrient-rich diet, regular exercise, and quality sleep will help manage weight.

2 WEIGHT GAIN & WEIGHT LOSS RESISTANCE
VERY HIGH

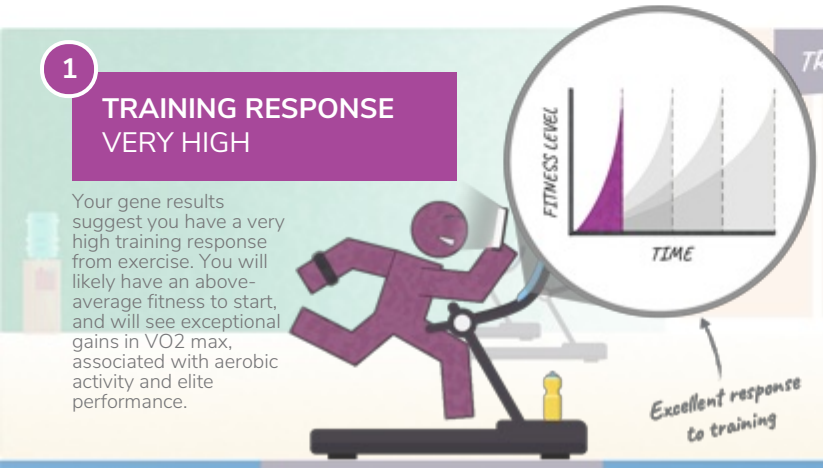
The ability to maintain a healthy body weight varies by person. Your results suggest that your genes will strongly impact your ability to manage your weight. Set realistic goals, use cognitive behavioral therapy and mindfulness to assist.

ACTIVITY OVERVIEW

Your activity infographic provides insights into how your body responds to training. Understanding the best training strategy for your body helps you train effectively while avoiding injury. Your potential for endurance and power-based sports performance provides insights to optimize and personalize your training program. Finally, knowing how your body recovers helps you train and achieve your fitness goals in a sustainable way.

1 TRAINING RESPONSE
VERY HIGH

Your gene results suggest you have a very high training response from exercise. You will likely have an above-average fitness to start, and will see exceptional gains in VO2 max, associated with aerobic activity and elite performance.



TRAINING FOR THE RACE

Invest in strength, balance and range of motion exercises to prevent injuries

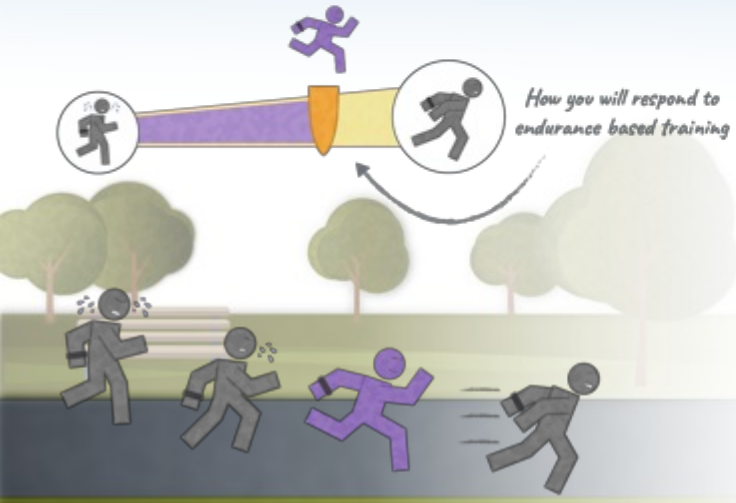
2 INJURY
VERY HIGH

Your results suggest a very high risk for soft tissue injury. Regularly include movements that improve range of motion, strength and balance. Consult with an exercise specialist to assess injury risk and discuss preventative activities.

COMPETING IN THE RACE

3 ENDURANCE
HIGH ★ ACE II

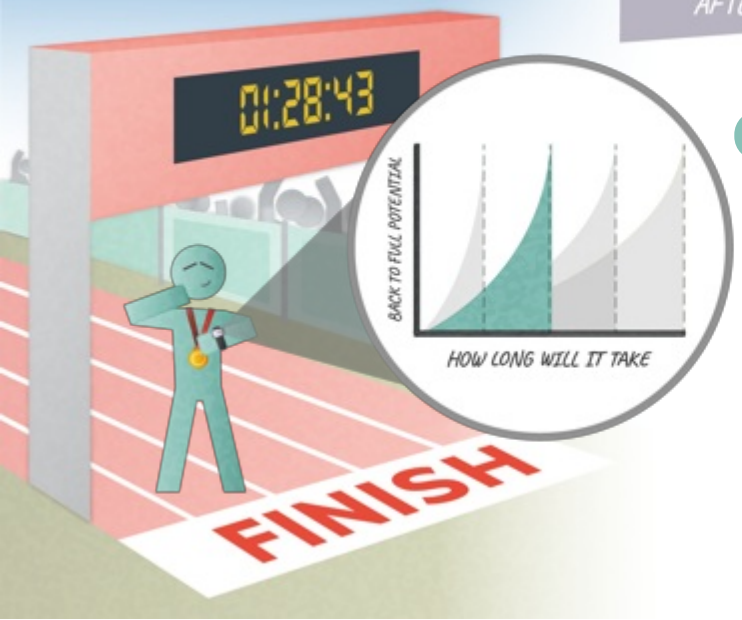
Your gene results suggest you possess the potential to achieve high levels of endurance performance. Plan a progressive and consistent training regimen for large gains in endurance performance. Gradually increase frequency and duration.



5 POWER
LOW ★ ACTN3 RR

Your results suggest an average response to power training. Power and strength are worth maintaining to perform many activities of daily living. Perform full-body functional movements rather than targeting specific muscles.

AFTER THE RACE



4 RECOVERY
MEDIUM

Your results suggest you may need some support to achieve adequate recovery between exercise sessions. Plan for active recovery sessions or rest days, and ensure quality sleep and nutrient-dense foods to enhance recovery times.

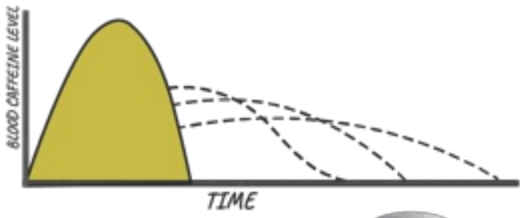
Low intensity activities helps with recovery

NUTRIENTS OVERVIEW

The vitamins, minerals and compounds we find in food are integral to keeping our body's processes working optimally. They keep our cells robust, efficient and healthy, they support the work of our genes, and they help transport oxygen to the tissues. Making the best choices means understanding how much we need of these nutrients, which foods we should choose. It also gives us insight into how we respond to certain nutrients.

7 CAFFEINE
LOW

The efficiency with which we process caffeine varies by person; affecting our sleep, detoxification, alertness and sports performance. As a fast metabolizer, you may not need to limit your caffeine consumption.



10 IRON OVERLOAD
LOW

Excessive iron accumulation in the body can damage organs and precipitate disease conditions such as cancer, irregular heartbeat, and liver cirrhosis. Genetic variants associated with iron overload were not detected.

6 FATTY ACIDS
LOW

Fatty acids, the building blocks of dietary fat, play many important roles in the body including cell membrane structure and function. Your genetic results indicate that you are able to optimize fatty acid processes.

5 CHOLINE
LOW

Choline regulates memory, mood, and DNA building and plays a valuable role in pregnancy. Your results indicate that synthesis and availability of choline is not affected by your genes. Adequate dietary intake is still advised.

2 FOLATE
HIGH

Genetically, you have a reduced ability to optimally use dietary folate. Folate works with other B vitamins to build tissues, maintain brain chemicals, and ensure DNA health. Eat dark green leafy vegetables and beans daily.

9

GLUTEN
LOW

Your genetic results indicate that you are not likely to develop celiac disease. Investigate for other food sensitivities or non-celiac gluten sensitivity if symptomatic.

4

VITAMIN D
MEDIUM

Vitamin D is a vital nutrient involved in many biochemical pathways, essential for heart, bone and neurological health. Your results show that you need to ensure sufficient vitamin D intake and production to function optimally.

3

SALT
MEDIUM

★ ACE II

Salt has the potential to raise blood pressure, but genetics influences the extent to which this may happen. Your genetic results show you may benefit from moderate salt restriction to manage or prevent high blood pressure.

8

VITAMIN C
LOW

Although vitamin C activity is not affected by your genes, it is an important nutrient for the maintenance of connective tissue, immune health and the removal of toxins. Ensure foods rich in vitamin C are included in your diet.

1

VITAMIN B12
VERY HIGH

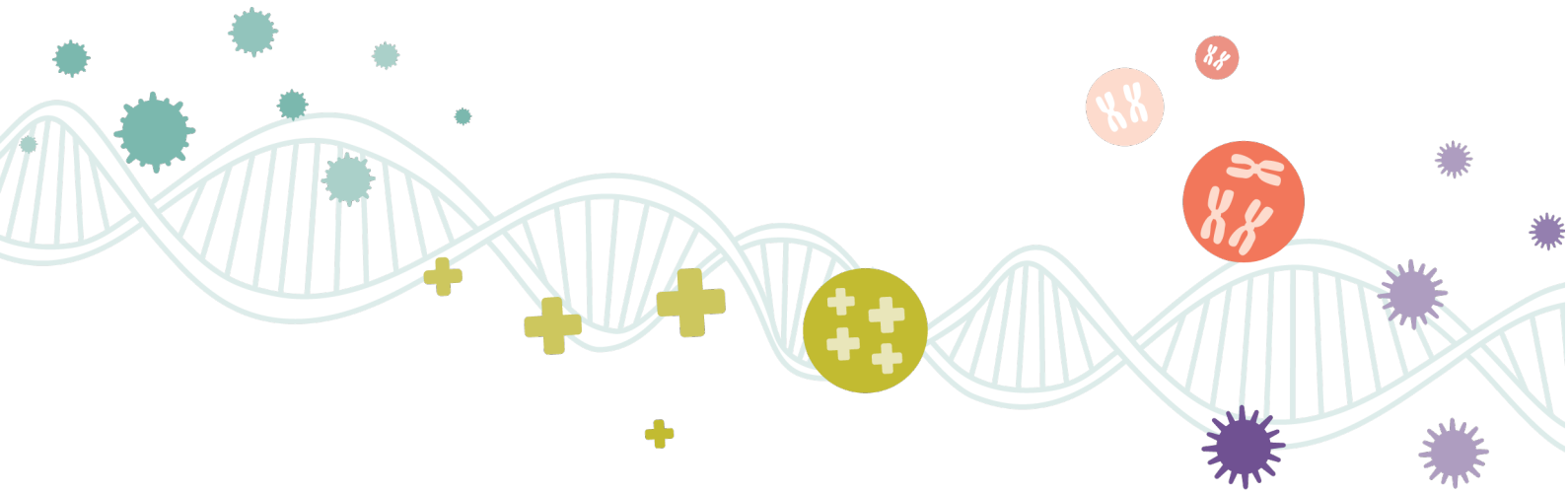
★ TCN2 GG

Vitamin B12 is an essential nutrient for both brain and blood cells, as well as for the making of DNA. Genetically, you may have a markedly reduced ability to transport B12 to cells making animal protein foods or a B12 supplement necessary.

CLOSING

Practitioner-Driven Personalization

Whether you want to focus on personal well-being, managing your weight, preventing chronic illness, or up your athletic performance, your 3X4 Blueprint will help you get there, but genetic results provide only partial information about our health. When your genetics insights are combined with your medical history, unique lifestyle, diet preferences and exercise choices, a full picture starts to emerge. If you are looking for a detailed action plan our practitioner partners are ready to guide you on your health journey.



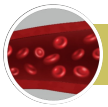
THE GLOSSARY

ADIPOGENESIS | HIGH — ENERGY

The formation, storage, and release of fat cells are affected by variability in our genes. These gene variations may be partly responsible for why some people find it easy to gain or lose weight compared to others, even though their diet and lifestyles are similar. How our fat cells release energy is determined by certain genes and their variations. Knowing how your fat cells are predisposed to store and release energy can empower you to make the right diet and lifestyle choices to suit your unique genotype.

APPETITE/SATIETY/INTAKE | LOW — ENERGY

Some people are very sensitive to the sensation of satiety (fullness), while others often overeat and take longer to register that they are full. We all experience hunger and fullness differently. While many people believe that serving sizes and other eating behaviors should be equal for all, variations in our genes determine our appetite level and satiety to some degree, and consequently, may affect our eating patterns (snacking, binge eating, servings, frequency of meals, etc.) in a very real, biological way.

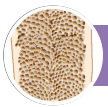


BLOOD CLOTTING | LOW — CARDIOVASCULAR HEALTH

Blood clotting is a survival mechanism designed to prevent uncontrolled bleeding. On the other hand, excess blood clotting, which may be linked to genetic variants coupled with diet and lifestyle factors also needs to be addressed. When clotting occurs, the clot travels to a small blood vessel or vein in either the heart, brain or extremities and may result in a stroke, heart attack or deep vein thrombosis. There are numerous preventative actions that can be taken.

BLOOD PRESSURE | MEDIUM — CARDIOVASCULAR HEALTH

Blood pressure indicates how hard the heart is working in order to pump blood around the circulatory system, and is used as a measure for confirming good health. High blood pressure can cause damage to blood vessels, delicate tissues in organs and systems in the body. Genetic variance impacts the ability to contract and relax blood vessels and balance fluid volume within them.



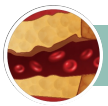
BONE HEALTH | HIGH — SYSTEMS

Bones offer important structural support and protective roles within our body. Bone is made up of minerals such as calcium and phosphorus, which is also used elsewhere in the body. The turnover of these minerals in the breakdown or build-up of new bone cells is important for bone health. Gene variants may impact these processes and affect the balance of breakdown and build-up. Diet and lifestyle choices also contribute a great deal to these processes.

CAFFEINE | LOW — NUTRIENTS

Caffeine is a central nervous system stimulant. In small amounts, caffeine's effects include mild euphoria, alertness, and enhanced cognitive performance, but in higher quantities, it can trigger anxiety, restlessness, irritability, nausea, and insomnia. The break down (metabolism) of caffeine in the body can vary to up to 40-fold between individuals, and is largely a genetically-determined ability. Certain gene variants confer a higher sensitivity to caffeine and are associated with slower metabolism of caffeine.

THE GLOSSARY

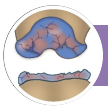


CHOLESTEROL | MEDIUM — CARDIOVASCULAR HEALTH

Cholesterol metabolism refers to processes that determine the distribution of lipids in the body. Fats bind to proteins that transport them in the bloodstream between organs. Different forms of fat particles have important roles to play as part of cell membrane structures and as precursors for hormones. Suboptimal cholesterol processes may result in an imbalance in the accumulation and breakdown of fats in the bloodstream, which most commonly leads to cardiovascular diseases like heart disease and stroke.

CHOLINE | LOW — NUTRIENTS

Choline is a vitamin that plays an important role in the building of cell membranes. It is a key nutrient for a healthy pregnancy, mood regulation, memory and making new DNA. It is also involved in fat transport and supports methylation. Certain genes may affect the availability of choline, increasing dietary choline requirements.



COLLAGEN & JOINTS | HIGH — SYSTEMS

All our cells are continuously being renewed by being broken down and replaced by new ones. Collagen is the major structural protein and the foundation of all our soft-tissue (skin, hair, nails, joints, and organs). Variations in collagen genes might affect the structure and function of these areas. Causing excessive breakdown of cells without a comparable formation of new cells will result in degeneration. Genes play a large part in the process of collagen formation and breakdown, as does lifestyle factors such as diet and exercise.

DETOXIFICATION | HIGH — CELLULAR

Detoxification is the body's way of getting rid of toxins that could otherwise build up and interfere with health. Signs of poor detox include lethargy, fatigue, difficulty concentrating and unexplained aches and pains in the body. The liver is the main site of whole-body detox but every cell has its own toxin-eliminating processes to keep it clean, healthy and working well. Detoxification can be optimized by making the right diet and lifestyle changes to support good cellular cleaning processes.

ENDURANCE | HIGH — ACTIVITY

Endurance refers to activities where muscles are exercised at lower intensities for prolonged periods of time. Your genes play a role in determining how well you will respond to endurance-based activities, and can be used as a guide to optimize your exercise program to get the best results. Endurance levels will improve when you follow a program that gradually increases your training load (duration, frequency and intensity). Numerous health benefits can be achieved at lower intensities of exercise.

ENERGY EXPENDITURE | HIGH — ENERGY

Energy expenditure is the amount of energy (kilojoules or calories) that is needed to carry out important functions such as breathing, digesting food, circulating blood, regulating temperature, and exercising. The more commonly used term when referring to how we burn calories is to say we have a 'fast' or 'slow' metabolism. The rate at which we use and manage calories for energy is largely determined by our genes, our activity, what and how much we eat, resulting in significant individual differences between how we burn energy.

THE GLOSSARY

EXERCISE RESPONSE | HIGH — ENERGY

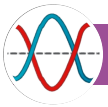
Research has confirmed that people's response to exercise varies considerably. Some respond quickly to exercise (e.g. they get fit fast and their body composition changes favorably), while others are less sensitive to exercise's effects. A significant contributor to these differences in exercise response is genetics. An individual's ability to mobilize stored body fat and burn it for exercise fuel is partly predisposed by certain genes. It is useful to understand the extent exercise may help weight loss and how to balance these factors out.

FATTY ACIDS | LOW — NUTRIENTS

Fatty acids are the building blocks of fats and perform many important functions in the body. They are the base for cell membranes, help make hormones, are involved in inflammation, brain function and the immune system. Different dietary fats impact the body in different ways and our genes impact how these fats are metabolized and processed. Good quality dietary fat intake may correct these imbalances driven by genes.

FOLATE | HIGH — NUTRIENTS

Folate is an essential vitamin that works together with all B vitamins and plays a vital role in methylation. Folate also helps maintain brain, nerve, blood cells, and DNA health. Natural occurring folate is found in numerous foods including leafy greens, legumes and asparagus. The synthetic form is called folic acid, commonly used in supplements and fortified foods, but is less beneficial compared to folate. Genetic variation affects the availability and the requirement for folate.



GLUCOSE & INSULIN | VERY HIGH — SYSTEMS

Our cells run on glucose, a simple sugar obtained from the food we eat. Our bodies work hard to ensure the amount of glucose in the blood is kept at just the right level. High blood glucose is often associated with weight issues and diabetes, but chronically elevated blood sugar also has other effects such as accelerated aging and chronic inflammation, which underlie every major chronic illness. Insulin is manufactured in the body and is used to regulate glucose levels. The way insulin and glucose do their job is determined by certain genes as well as by other factors such as our weight, diet, and lifestyle choices.

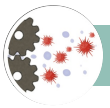
GLUTEN | LOW — NUTRIENTS

Celiac disease occurs when there is an immune reaction to gluten which is the protein found in wheat, barley, triticale and rye. In these cases, gluten can cause inflammation in the gut which may damage the gut wall and potentially lead to complications resulting in deficiency conditions like anemia, osteoporosis and thyroid problems. If certain genes variants are present, gluten may need to be removed from the diet completely.

HISTAMINE OVERLOAD | LOW — SYSTEMS

Histamine is a chemical produced by mast cells, that is involved in immunity and the removal of allergens from the body. It also helps with digestion and is released in response to injury and toxins. Histamine can be made by bacteria in the gut but is also present in certain foods. Genes regulate enzymes that are responsible for histamine breakdown. Inefficient breakdown may result in a histamine overload and cause symptoms like migraines, flushing, dizziness, skin rashes and hives.

THE GLOSSARY



HORMONE BALANCE | MEDIUM — SYSTEMS

Hormones are chemical messengers produced by our glands. They instruct organs and systems in the body on how to function. The main female hormones include estrogen and progesterone. These are necessary throughout the life cycle for the regulation of most major female-related bodily processes including puberty, fertility, pregnancy, and menopause. Androgens are also present in women but to a lesser degree. The main male hormones are known as androgens which include the powerful male hormone testosterone. Androgens are necessary throughout the life cycle for the regulation of most major male-related bodily processes including puberty, fertility, and andropause. Estrogen is also present in men but to a lesser degree. Ineffective hormone metabolism can contribute to certain conditions. Genes, as well as diet and lifestyle factors, regulate the activation and breakdown of these hormones.

INFLAMMATION | HIGH — CELLULAR

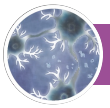
Inflammation is a normal automatic immune response to injury, irritation or infection. When you bump your toe and it becomes swollen, that's the inflammatory response working to speed up healing. Sometimes injuries or irritations are internal (in places like our gut, muscles, joints, or blood vessels). Inflammation is protective by design, but can become destructive if left unchecked. Long term, chronic inflammation can eventually lead to conditions like arthritis, eczema, IBS, autoimmune conditions, and several diseases.

INJURY | VERY HIGH — ACTIVITY

Injuries are caused by many internal and external factors. A torn tissue or chronic overuse of muscles, tendons or ligaments does not affect everyone in the same way, or necessarily result in injury. The combination of your body's make-up and genetics contribute to the development of injuries. Knowing your genetically determined risk for injury can help to manage and avoid these risks, and help you adjust exercise, lifestyle, diet, and recovery routines accordingly.

IRON OVERLOAD | LOW — NUTRIENTS

Certain genes affect the body's ability to transport iron from the tissues to the blood, so that excess iron can be excreted. Excessive iron accumulation within the tissues, known as hemochromatosis, is a condition that can result in the damage of organs which can precipitate disease conditions such as diabetes, cancer, irregular heart beat and liver cirrhosis.



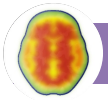
MEMORY & BRAIN HEALTH | VERY HIGH — SYSTEMS

The brain is the control center of the body, and keeping it healthy is crucial for overall mental and physical health. Apart from regulating all of your hormones and other biological processes, the brain is also responsible for cognitive function, including attention, focus, learning capacity, and memory. Brain health and function tend to decline with age but at a faster rate in individuals with unfavorable diet and lifestyle behaviors. Certain genetic variations may be another reason why our brain health and cognitive function might not be optimal.

METHYLATION | VERY HIGH — CELLULAR

Methylation is the biochemical process of making sure every cell is functioning optimally. Methylation is not just responsible for how we repair genetic material, but also how we make energy, respond to stress, handle inflammation, how well our cells detoxify, and how our brain chemistry works. Methylation is the process involved in actually turning genes on or off. We may be able to reduce our risk of developing certain diseases and some types of cancers by optimizing methylation.

THE GLOSSARY



MOOD & BEHAVIOR | HIGH — SYSTEMS

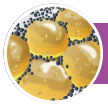
It is normal for our mood to change depending on the situation, but when our emotional state leads to changes in behavior that affect our ability to deal with daily routines, support should be sought. Genetics affects our ability to manufacture and balance chemicals in the brain that are necessary to manage mood, anxiety, depression, addiction and related behaviors. In addition, diet and lifestyle choices impact brain chemicals and may require adjustment.

OXIDATIVE STRESS | VERY HIGH — CELLULAR

Oxidative stress is the human equivalent of rusting. The impact of all exposures over time results in damage to our cells. Unmanaged, oxidation can impact on our energy levels, memory, premature aging and sometimes cancer risk. In a healthy functioning cell, enzymes that counteract oxidative damage, a 'rust block' so to speak, are made. The ability to make those enzymes is determined by certain genes. However, a good diet and lifestyle can aid towards a lower oxidative burden and help maintain the health of your cells.

POWER | LOW — ACTIVITY

Power refers to activities where muscles are exercised at higher intensities for shorter periods of time. It is the product of force and the speed at which the action is performed. Power is important for athletic performance, and genetics play a significant role in how a person's power capacity can improve following a strength and power-based training program. Many daily activities are enhanced by adequate power capacity. It becomes even more important to continue with strength and power-based exercises as you age and muscle mass decreases.



PRO-INFLAMMATORY FAT | VERY HIGH — ENERGY

Fat cells are not just inactive storage compartments for excess weight - they are metabolically active messengers that control our energy levels. These messenger molecules found in fat tissue are called adipokines. Fat tissue secretes various pro- and anti-inflammatory adipokines to manage inflammation. If there is excess adipose tissue in the body, the inflammatory response can become disrupted, and these proinflammatory molecules increase. Obesity-induced inflammation can be managed by losing excess weight, which reduces adipokines.

RECOVERY | MEDIUM — ACTIVITY

Because exercise is a type of ‘stress’ on the body (the good kind of stress), some level of wear and tear inevitably occurs in muscles and tissues during and directly after a workout (this is how muscles grow). Given the right recovery resources and building blocks, the body quickly repairs and rebuilds muscles and tissues back to a healthy, normal state, ready for the next exertion. Without enough recovery time or resources, inflammation and oxidative stress can arise in the body and the risk for tissue break-down, injury, and pain increases.

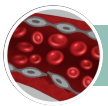
SALT | MEDIUM — NUTRIENTS

Salt sensitivity is estimated to be present in 51% of individuals with high blood pressure and 26% with normal blood pressure. In individuals with salt sensitivity, blood pressure may increase when excess sodium is consumed. Although the mechanisms underlying salt sensitivity are complex, your genes can help determine and predict your response to salt.

THE GLOSSARY

TRAINING RESPONSE | VERY HIGH — ACTIVITY

Your genetics plays a significant role in influencing your baseline fitness level, as well as your response to aerobic training. Your fitness levels and training response can be measured as VO2 max, which is the maximum amount of oxygen you can use during intense exercise. The higher your VO2 max, the fitter you are. Being fitter reduces your risk of cardiovascular disease and improves quality of life. High VO2 max levels are associated with performance in endurance-based sports.



VASCULAR HEALTH | MEDIUM — CARDIOVASCULAR HEALTH

Veins and arteries make up a network in the body responsible for transporting oxygen and nutrients to our organs and systems, and for removing waste. Having healthy blood vessels means maintaining their strength and flexibility. Loss of function makes them vulnerable to damage and disease. Certain genes, and diet and lifestyle factors influence how these vessels are maintained and kept healthy.

VITAMIN B12 | VERY HIGH — NUTRIENTS

Vitamin B12 is an essential vitamin that works together with folate and other B vitamins . It's a major player in maintaining the health of both brain and blood cells, as well as the synthesis of DNA. Vitamin B12 is exclusively available from animal products, but may be made in the gut by bacteria. Genes may affect the availability, metabolism and requirement for Vitamin B12.

VITAMIN C | LOW — NUTRIENTS

Vitamin C is capable of excreting or neutralizing substances such as toxins and biproducts of normal cellular function that may cause rust-like damage within our cells. It is also a key nutrient in the health of our collagen and blood vessels and assists in iron absorption, and wound healing. Certain genes show us how effective we are at activating vitamin C for use in these functions.

VITAMIN D | MEDIUM — NUTRIENTS

Vitamin D is made in the skin when exposed to sunlight. It is then activated in the liver and kidneys to produce vitamin D3. Vitamin D3 is able to switch multiple genes on, genes that are responsible for the maintenance of bone health and immunity, as well as the health of the hormone, glucose and cardiovascular systems. Variants in the VDR gene impact absorption, metabolism, and utilization of Vitamin D, therefore dietary intervention and increased sun exposure may be required.

WEIGHT GAIN & WEIGHT LOSS RESISTANCE| VERY HIGH — ENERGY

There is considerable inter-individual variability in our physical ability to lose, gain, or maintain a healthy weight. Certain gene variations affect how we regulate energy and make us more genetically- prone to weight gain and slow weight loss. A one-size-fits-all model does not exist when it comes to how much or how frequently we should eat, or what type of exercise we should do and for how long. Genetic variations can explain, at least in part, how people respond to overeating, exercise, and diet.

GENES BY PATHWAY

Hugh Raye

You will notice that some of the genes have a star ★ next to them. Based on your individual results, these genes have been identified as having a bigger impact on your pathways and individual health.

CELLULAR

METHYLATION 1		OXIDATIVE STRESS 2		INFLAMMATION 3		DETOXIFICATION 4	
COMT Val158Met G>A	GA	MNSOD Val16Ala T>C	TT	IL-1 +/–	+	★ GSTM1 INS/DEL	DEL
MTHFR 1298 A>C	AC	PPARGC1A Gly482Ser G>A	GA	CRP 2147 G>A	GG	CYP1B1 Leu432Val C>G	GG
MTHFR 677 C>T	CT	ENOS Glu298Asp G>T	TT	ENOS Glu298Asp G>T	TT	NAT2 R/I/S	Slow
MTR 2756 A>G	GG	GSTM1 INS/DEL	DEL	CYP1B1 Leu432Val C>G	GG	COMT Val158Met G>A	GA
TCN2 776 C>G	GG	NQO1 Pro187Ser C>T	CT	FUT2 Gly258Ser G>A	GA	MNSOD Val16Ala T>C	TT
CBS 699 C>T	CT	PPARG Pro12Ala C>G	CC	HNMT Thr105Ile C>T	CT	NQO1 Pro187Ser C>T	CT
MTHFD1 1958 G>A	GA	GPX1 Pro198Leu C>T	CT	MNSOD Val16Ala T>C	TT	CYP17A1 34 T>C	TC
MTRR 66 A>G	AG	HO-1 –413 A>T	AT	SIRT1 994 T>C	TT	CYP2C9 Arg144Cys C>T	CT
NBPF3 T>C	TC	PON1 Gln192Arg A>G	AG	FADS1 592 G>T	GT	MTHFR 677 C>T	CT
NQO1 Pro187Ser C>T	CT	TNFA –308 G>A	GA	HO-1 –413 A>T	AT	PON1 Gln192Arg A>G	AG
PEMT –744 G>C	GC	CAT –262 C>T	CC	IL-6R Asp358Ala A>C	AC	ALDH2 Glu504Lys G>A	GG
BHMT Arg239Glu G>A	GA	ALDH2 Glu504Lys G>A	GG	TNFA –308 G>A	GA	CYP1A1 Ile462Val A>G	AA
OGG1 Ser326Cys C>G	CC	APOE E2/E3/E4	E3/E3	APOE E2/E3/E4	E3/E3	CYP1A2 –163 A>C	AA
		GSTO2 Asn142Asp A>G	AA	CYP1A1 Ile462Val A>G	AA	CYP1B1 Asn453Ser A>G	AA
		GSTP1 Ile105Val A>G	AA	DAO His645Asp C>G	CC	CYP2C19 *1/*2/*17	*1/*1
		GSTT1 INS/DEL	INS	FOXO3 G>T	GT	CYP2C9 Ile359Leu A>C	AA
		HFE C282Y/H63D	CC/HH	FUT2 Trp153Ter G>A	GA	CYP2D6 *1/*3/*10	*1/*1
		OGG1 Ser326Cys C>G	CC	HLA DQ 2.2/2.5/8	DQ2.2/DQ2.2	CYP3A4 –392 A>G	AA
		UCP1 –3826 A>G	AA	IL-6 –174 G>C	GG	EPHX1 Tyr113His T>C	TT
		UCP2 –866 G>A	GG	PPARA 89204 G>C	GG	GSTO2 Asn142Asp A>G	AA
		UCP3 –55 C>T	CC	TIMP4 –55 T>C	CT	GSTP1 Ala114Val C>T	CC
				TNFA –238 G>A	GG	GSTP1 Ile105Val A>G	AA
						GSTT1 INS/DEL	INS
						NAT1 Arg187Gln G>A	GG
						SULT1A1 Arg213His G>A	GG

GENES BY PATHWAY

SYSTEMS

GLUCOSE & INSULIN 1		MEMORY & BRAIN HEALTH 2		COLLAGEN & JOINTS 3		MOOD & BEHAVIOR 4	
PPARGC1A Gly482Ser G>A	GA	ENOS Glu298Asp G>T	TT	GDF5 5'UTR C>T	TT	MAOA Arg297Arg G>T	TT
TCF7L2 IVS3 C>T	TT	MNSOD Val16Ala T>C	TT	COL12A1 AluI A>G	AA	DRD1 –48 G>A	GA
FTO 87653 T>A	AA	MTHFR 1298 A>C	AC	VEGFA -2578 C>A	AA	DRD3 Ser9Gly T>C	CT
PPARG Pro12Ala C>G	CC	MTHFR 677 C>T	CT	COL1A1 1546 G>T	GG	DRD4 –521 C>T	TT
ADIPOQ –11391 G>A	GG	MTR 2756 A>G	GG	COL3A1 Ala698Thr G>A	GA	COMT Val158Met G>A	GA
ADIPOQ –395 G>A	GA	NQO1 Pro187Ser C>T	CT	MMP1 –1607 1G/2G	1G/1G	MTHFR 1298 A>C	AC
ADRB2 Arg16Gly A>G	AG	BDNF Val66Met G>A	GA	MMP3 A>G	AG	MTHFR 677 C>T	CT
ADRB2 Gln27Glu C>G	CG	IL-6R Asp358Ala A>C	AC			MTR 2756 A>G	GG
CETP Taq1B G>A	GA	APOE E2/E3/E4	E3/E3			AKT1 G1172+23A T>C	TC
DIO2 Thr92Ala T>C	TC	COMT Val158Met G>A	GA			BDNF Val66Met G>A	GA
IRS1 C>T	CT					OXTR A>G	AG
TNFA –308 G>A	GA					ANK3 318473 C>T	CC
APOA2 –492 T>C	TT					ANK3 A>G	AA
FABP2 Ala54Thr G>A	GG					CACNA1C G>A	GG
FOXO1 A>G	AA					CHRNA5 Asp398Asn G>A	GG
FOXO3 G>T	GT					CHRNA5 C>T	CC
PPARA 89204 G>C	GG					DRD1 –94 G>A	GG
SLC2A2 Thr110Ile C>T	CC					DRD2 TaqIA C>T	CC
UCP2 –866 G>A	GG					FAAH Pro129Thr C>A	CC
						GABRA2 Lys132Lys A>G	AA
						HTR1A –1019 C>G	CC
						OPRM1 Asn40Asp A>G	AA

GENES BY PATHWAY

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SYSTEMS

BONE HEALTH	5
CYP2R1 A>G	GG
GDF5 5'UTR C>T	TT
DIO2 Thr92Ala T>C	TC
VDR Bsm1 G>A	GA
TIMP4 –55 T>C	CT
COL1A1 1546 G>T	GG
VDR Fok1 T>C	CC
VDR Taq1 T>C	TC

HORMONE BALANCE	6
CYP1B1 Leu432Val C>G	GG
GSTM1 INS/DEL	DEL
COMT Val158Met G>A	GA
MNSOD Val16Ala T>C	TT
CYP17A1 34 T>C	TC
MTHFR 677 C>T	CT
NQO1 Pro187Ser C>T	CT
CYP19A1 C>T	CC
CYP1A1 Ile462Val A>G	AA
CYP1B1 Asn453Ser A>G	AA
CYP2C19 *1/*2/*17	*1/*1
CYP3A4 –392 A>G	AA
EPHX1 Tyr113His T>C	TT
GSTP1 Ile105Val A>G	AA
GSTT1 INS/DEL	INS
SHBG Pro185Leu C>T	CC
SHBG –68 G>A	GG
SRD5A1 A>G	AA
SULT1A1 Arg213His G>A	GG
UGT2B15 T>G	GG
UGT2B17 INS/DEL	INS

HISTAMINE OVERLOAD	7
HNMT Thr105Ile C>T	CT
HNMT 939 A>G	AG
DAO C>T	CC
DAO His645Asp C>G	CC

GENES BY PATHWAY

CARDIOVASCULAR HEALTH

VASCULAR HEALTH 1		CHOLESTEROL 2		BLOOD PRESSURE 3		BLOOD CLOTTING 4	
CRP 2147 G>A	GG	IL-6 –174 G>C	GG	ACE2 7132 T>C	TT	ENOS Glu298Asp G>T	TT
ENOS Glu298Asp G>T	TT	CETP G>A	GA	ENOS Glu298Asp G>T	TT	F2 20210 G>A	GG
MTHFR 1298 A>C	AC	CETP Taq1B G>A	GA	AGT Met235Thr A>G	AG	F5 Arg506Gln G>A	GG
AGT Met235Thr A>G	AG	LPL Ser474Ter C>G	CG	ACE Ins/Del	II	HPA-1 T>C	TT
CETP Taq1B G>A	GA	APOA5 C>A	CC	ACE2 A>G	AA		
HO-1 –413 A>T	AT	APOA5 –1131 T>C	TT				
LPL Ser474Ter C>G	CG	APOC3 3175 C>G	CC				
MTHFR 677 C>T	CT	APOE E2/E3/E4	E3/E3				
ACE Ins/Del	II	FABP2 Ala54Thr G>A	GG				
ALDH2 Glu504Lys G>A	GG	TNFA –238 G>A	GG				
APOA5 –1131 T>C	TT						
APOE E2/E3/E4	E3/E3						
F2 20210 G>A	GG						
F5 Arg506Gln G>A	GG						
HPA-1 T>C	TT						
IL-6 –174 G>C	GG						
OGG1 Ser326Cys C>G	CC						
PPARA 89204 G>C	GG						
VEGF –634 G>C	GG						

GENES BY PATHWAY

ENERGY

PRO-INFLAMMATORY FAT	1
IL-1 +/–	+
ADIPOQ –11391 G>A	GG
CRP 2147 G>A	GG
ADIPOQ –395 G>A	GA
IL-6R Asp358Ala A>C	AC
TNFA –308 G>A	GA
IL-6 –174 G>C	GG
TNFA –238 G>A	GG

WEIGHT GAIN & WEIGHT LOSS RESISTANCE	2
FTO 87653 T>A	AA
ADIPOQ –11391 G>A	GG
LEPR Lys109Arg A>G	AA
TCF7L2 IVS3 C>T	TT
MMP2 Gly226Gly G>C	CC
ADRB2 Arg16Gly A>G	AG
ADRB2 Gln27Glu C>G	CG
LEPR Lys656Asn G>C	GC
PLIN 11482 G>A	GA
ADIPOQ –395 G>A	GA
ADRB3 Trp64Arg T>C	TT
APOA2 –492 T>C	TT
APOA5 –1131 T>C	TT
CLOCK 3111 T>C	TT
FABP2 Ala54Thr G>A	GG
LEPR Gln223Arg A>G	AA
MC4R T>C	TT
PPARG Pro12Ala C>G	CC
UCP1 –3826 A>G	AA
UCP2 –866 G>A	GG
UCP3 –55 C>T	CC

ADIPOGENESIS	3
PPARGC1A Gly482Ser G>A	GA
MMP2 Gly226Gly G>C	CC
ADRB2 Arg16Gly A>G	AG
ADRB2 Gln27Glu C>G	CG
PLIN 11482 G>A	GA
ADRB3 Trp64Arg T>C	TT
FABP2 Ala54Thr G>A	GG
PPARG Pro12Ala C>G	CC

GENES BY PATHWAY

ENERGY

EXERCISE RESPONSE	4
FTO 87653 T>A	AA
LEPR Lys109Arg A>G	AA
ADRB2 Arg16Gly A>G	AG
ADRB2 Gln27Glu C>G	CG
LEPR Lys656Asn G>C	GC
ADRB3 Trp64Arg T>C	TT
CLOCK 3111 T>C	TT
LEPR Gln223Arg A>G	AA
MC4R T>C	TT

ENERGY EXPENDITURE	5
PPARGC1A Gly482Ser G>A	GA
FTO 87653 T>A	AA
ADRB2 Arg16Gly A>G	AG
ADRB2 Gln27Glu C>G	CG
LEPR Lys656Asn G>C	GC
ADRB3 Trp64Arg T>C	TT
CLOCK 3111 T>C	TT
LEPR Gln223Arg A>G	AA
LEPR Lys109Arg A>G	AA
MC4R T>C	TT
UCP1 –3826 A>G	AA
UCP2 –866 G>A	GG
UCP3 –55 C>T	CC

APPETITE/SATIETY/INTAKE	6
FTO 87653 T>A	AA
LEPR Lys656Asn G>C	GC
TAS2R38 Ala262Val C>T	CT
APOA2 –492 T>C	TT
CLOCK 3111 T>C	TT
DRD2 TaqIA C>T	CC
FAAH Pro129Thr C>A	CC
LEPR Gln223Arg A>G	AA
LEPR Lys109Arg A>G	AA
MC4R T>C	TT
SLC2A2 Thr110Ile C>T	CC

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ACTIVITY

TRAINING RESPONSE	1
ACE Ins/Del	II
AMPD1 133 C>T	CC
CAT –262 C>T	CC
CKM NcoI T>C	TT
HIF1A Pro582Ser C>T	CC
ACSL1 T>C	TC
VEGF –634 G>C	GG

INJURY	2
COL12A1 AluI A>G	AA
GDF5 5'UTR C>T	TT
VEGFA -2578 C>A	AA
TNFA –308 G>A	GA
COL1A1 1546 G>T	GG
COL3A1 Ala698Thr G>A	GA
MMP3 A>G	AG

ENDURANCE	3
★ ACE Ins/Del	II
CKM NcoI T>C	TT
PPARA 89204 G>C	GG
ADRB2 Arg16Gly A>G	AG
ADRB2 Gln27Glu C>G	CG
PPARD 294 T>C	TC
PPARGC1A Gly482Ser G>A	GA
NRF2 A>G	AA
VEGF –634 G>C	GG

RECOVERY	4
CRP 2147 G>A	GG
MNSOD Val16Ala T>C	TT
GPX1 Pro198Leu C>T	CT
IL-6R Asp358Ala A>C	AC
CAT –262 C>T	CC
IL-1 +/–	+
IL-6 –174 G>C	GG
TNFA –308 G>A	GA

POWER	5
★ ACTN3 577 R/X	RR
AMPD1 133 C>T	CC
IL-6 –174 G>C	GG
ACVR1B A>G	AG
ADRB2 Arg16Gly A>G	AG
ADRB2 Gln27Glu C>G	CG
AGT Met235Thr A>G	AG
ACE Ins/Del	II
CKM NcoI T>C	TT
HIF1A Pro582Ser C>T	CC
NOS3 –786 T>C	CC
PPARGC1A Gly482Ser G>A	GA
VDR Bsm1 G>A	GA
VDR Taq1 T>C	TC

GENES BY PATHWAY

NUTRIENTS

VITAMIN B12	1
★ TCN2 776 C>G	GG
FUT2 Gly258Ser G>A	GA

FOLATE	2
TCN2 776 C>G	GG
MTHFD1 1958 G>A	GA
MTHFR 677 C>T	CT
MTHFR 1298 A>C	AC

SALT	3
★ ACE Ins/Del	II
AGT Met235Thr A>G	AG

VITAMIN D	4
CYP2R1 A>G	GG
GC A>C	AC
VDR Bsm1 G>A	GA
VDR Fok1 T>C	CC
VDR Taq1 T>C	TC

CHOLINE	5
MTHFD1 1958 G>A	GA
PEMT –744 G>C	GC
BHMT Arg239Glu G>A	GA

FATTY ACIDS	6
FADS1 592 G>T	GT
APOA2 –492 T>C	TT
FADS2 C>G	CC

CAFFEINE	7
COMT Val158Met G>A	GA
NAT2 R/I/S	Slow
CYP1A2 –163 A>C	AA

VITAMIN C	8
GSTO2 Asn142Asp A>G	AA
SLC23A1 790 G>A	GG

GLUTEN	9
HLA DQ 2.2/2.5/8	DQ2.2/DQ2.2

IRON OVERLOAD	10
HFE C282Y/H63D	CC/HH