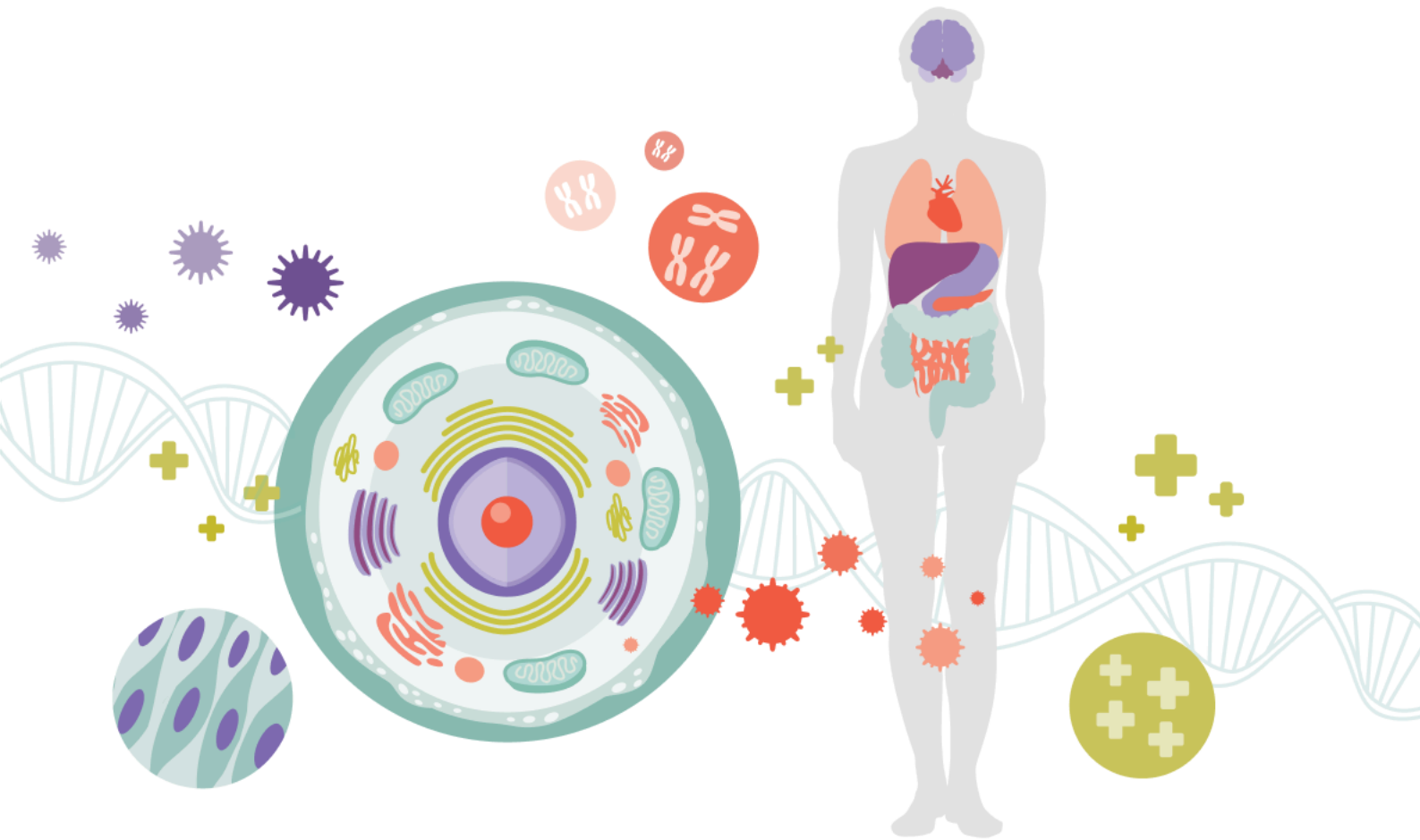




3x4 GENETICS



THE PERSONAL GENETIC STORY OF

CLIENT 305

Blueprint version 4.1.0

INTRODUCTION



You are completely unique

Your genes determine who you are and how you respond to the world around you, from the food you eat, the exercise you do, exposure to your environment, and even how you respond to stress you may encounter. Every decision you make, every minute of every day, changes the way your genes express themselves.

Reading and understanding your genetic blueprint gives you great insight into who you are. From here, you can discover and choose the most targeted actions and helpful habits to move you forward on your personalized path to better health.

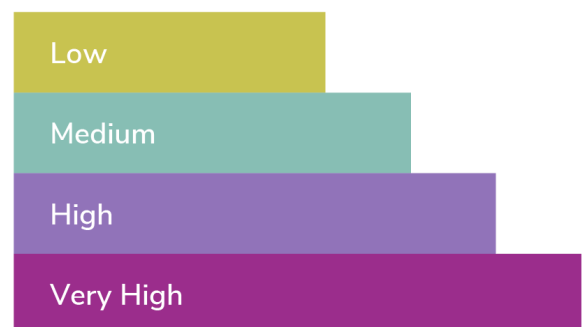
Let's get started on the journey.

Understanding Impact

If it impacts your health, it is included in the 3X4 Blueprint. The Blueprint report covers 36 metabolic pathways across 6 health categories. Each pathway is made up of several genetic variants that together impact the pathways' optimal function.

3X4 uses your unique genetic results to calculate an impact level for each pathway and uses color-coding to help you easily discover your most impactful genes and pathways.

Dark purple (genes have the greatest impact on your health) to light green (lowest impact on your health) helps you know where to start and what to focus on.



YOUR GENE RESULTS

Leanne Grantland

Your unique gene results are color-coded, with purple having the highest impact on your body, and light green the lowest impact. Genes with the most significant impact are indicated with a star ★, genes with a protective impact are indicated with a shield 🛡️, and genes that have a negative impact in the training response pathway are indicated with a chevron ↘️

Gene	Variant	Result
PROTECTIVE		
🛡️ TIMP4	-55 T>C	CT
🛡️ UCP2	-866 G>A	GA
🛡️ UCP3	-55 C>T	CT
NO IMPACT		
ACE2	A>G	AA
ACSL1	T>C	CC
ADIPOQ	-395 G>A	GG
ALDH2	Glu504Lys G>A	GG
AMPD1	133 C>T	CC
ANKK1/DRD2	TaqIA C>T	CC
APOA2	-492 T>C	TC
APOA5	-1131 T>C	TT
APOA5	C>A	CC
APOC3	3175 C>G	CC
BDNF	Val66Met G>A	GG
BHMT	Arg239Glu G>A	GG
CHDH	T>G	TT
CLOCK	3111 T>C	TT
COL1A1	1546 G>T	GG
CYP1A1	Ile462Val A>G	AA
CYP1B1	Asn453Ser A>G	AA
CYP2C19	*1/*2/*17	*1/*1
CYP2C9	Ile359Leu A>C	AA
CYP3A4	-392 A>G	AA
DAO	C>T	CC
DAO	His645Asp C>G	CC
DRD1	-94 G>A	GG
EPHX1	Tyr113His T>C	TT
ESR2	1730 G>A	GG
F2	20210 G>A	GG
F5	Arg506Gln G>A	GG
FAAH	Pro129Thr C>A	CC
FUT2	Trp153Ter G>A	GA
GABRA2	Lys132Lys A>G	AA
GAD1	83-218C>T	CT
GC	A>C	AA
GPX1	Pro198Leu C>T	CC
GSTO2	Asn142Asp A>G	AA
GSTP1	Ala114Val C>T	CC
GSTT1	INS/DEL	INS
HFE	C282Y/H63D	CC/HD

Gene	Variant	Result
NO IMPACT		
HIF1A	Pro582Ser C>T	CC
HLA	DQ 2.2/2.5/8	DQ2.2/DQ2.2
HNMT	Thr105Ile C>T	CC
HPA-1	T>C	TT
HTR1A	-1019 C>G	CC
IL-1	+/-	-
IL-6R	Asp358Ala A>C	AA
MAOA	Arg297Arg G>T	GT
MC4R	T>C	TT
MMP2	Gly226Gly G>C	GG
MMP3	A>G	AA
MTHFD1	1958 G>A	GG
MTHFR	1298 A>C	AA
MTR	2756 A>G	AA
NAT1	Arg187Gln G>A	GG
NQO1	Pro187Ser C>T	CC
NRF2	A>G	AA
OGG1	Ser326Cys C>G	CG
OPRM1	Asn40Asp A>G	AA
PLIN	11482 G>A	GG
PON1	Gln192Arg A>G	AA
PPARD	294 T>C	TC
REN	C-531T C>T	CC
SHBG	-68 G>A	GG
SHBG	Pro185Leu C>T	CC
SLC22A5	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
TNFA	-308 G>A	GG
UCP1	-3826 A>G	AA
UGT2B17	INS/DEL	INS
VDR	Fok1 T>C	CC
VDR	Taq1 T>C	TC
VEGF	-634 G>C	GG
VEGFR2	His472Gln T>A	TT
LOW		
AGTR1	1166 A>C	AC
AKT1	G1172+23A T>C	TC

YOUR GENE RESULTS

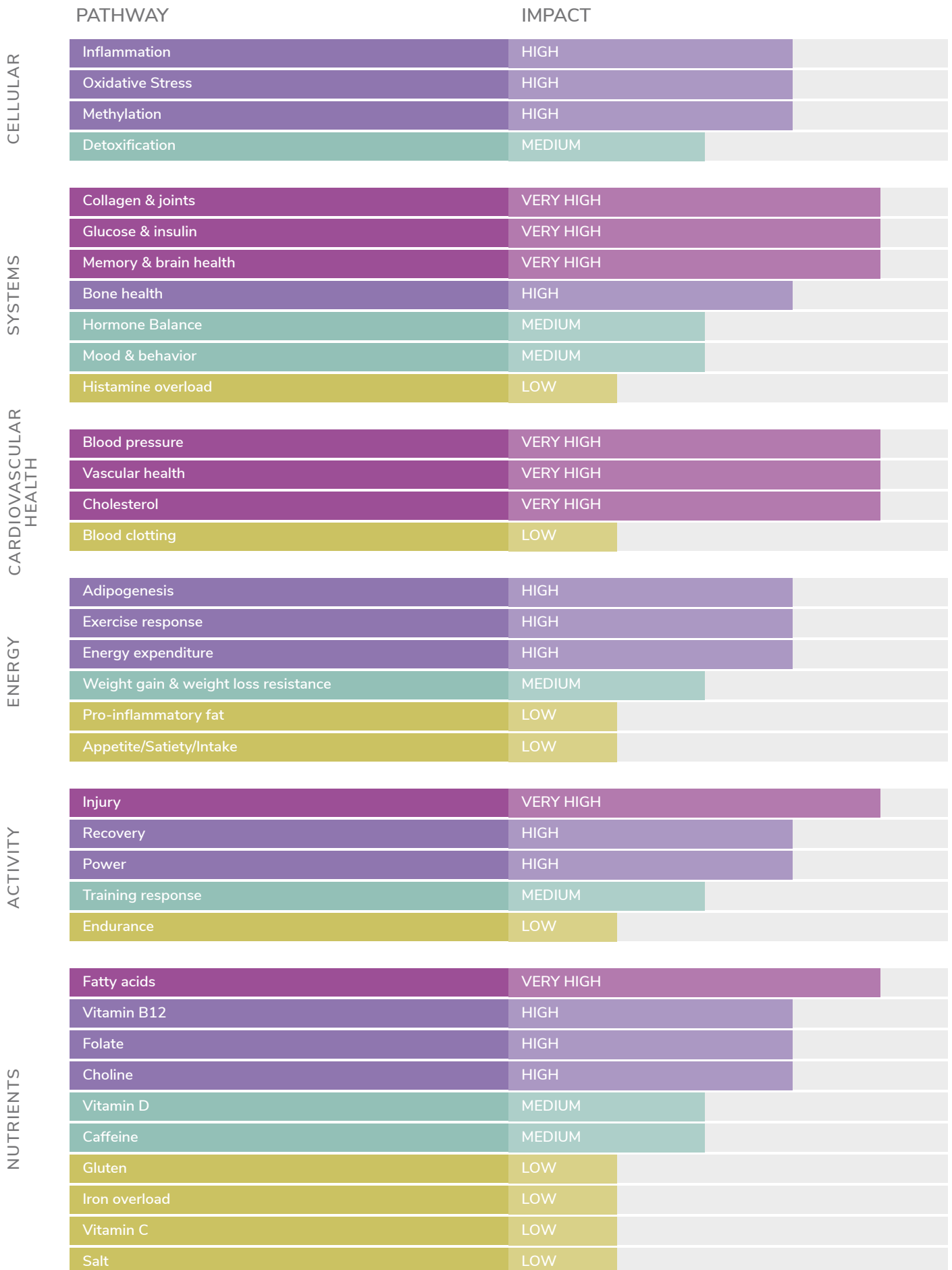
Leanne Grantland

Gene	Variant	Result
LOW		
ANK3	318473 C>T	CT
ANK3	A>G	AG
CACNA1C	G>A	GA
CBS	699 C>T	CT
CHRNA5	C>T	CT
CYP17A1	34 T>C	TC
DRD4	-521 C>T	CT
ENOS	Glu298Asp G>T	GT
FABP2	Ala54Thr G>A	GA
FADS1	592 G>T	GT
FADS2	C>G	CG
HO-1	-413 A>T	AT
LEPR	Lys109Arg A>G	AG
NOS3	-786 T>C	TC
TAS2R38	Ala262Val C>T	CT
UGT2B15	T>G	TG
MEDIUM		
5HT2A	102 C>T	CT
5HT2A	His452Tyr C>T	CT
5HT2A	-1438 G>A	GA
ADRB2	Arg16Gly A>G	AG
ADRB2	Gln27Glu C>G	CG
ADRB3	Trp64Arg T>C	TC
AGT	Met235Thr A>G	AG
CETP	Taq1B G>A	GA
CHRNA5	Asp398Asn G>A	GA
CYP1A2	-163 A>C	AC
CYP2C9	Arg144Cys C>T	TT
DIO2	Thr92Ala T>C	TC
FOXO1	A>G	GG
FTO	87653 T>A	TA
GSTP1	Ile105Val A>G	AG
LEPR	Gln223Arg A>G	AG
MMP1	-1607 1G/2G	1G/2G
MTRR	66 A>G	AG
NBPF3	T>C	CC
OXTR	A>G	AG
PPARA	89204 G>C	GC
SIRT1	994 T>C	TT
TCF7L2	IVS3 C>T	CT
TCN2	776 C>G	CG
VDR	Bsm1 G>A	GA
VEGFA	-2578 C>A	CA

Gene	Variant	Result
HIGH		
ACE2	7132 T>C	TT
ADIPOQ	-11391 G>A	GG
AGTR2	A>C	CC
CKM	NcoI T>C	TT
COL3A1	Ala698Thr G>A	AA
CYP19A1	C>T	TT
DRD1	-48 G>A	GA
DRD3	Ser9Gly C>T	CT
FUT2	Gly258Ser G>A	GA
IL-6	-174 G>C	GG
LEPR	Lys656Asn G>C	GG
LPL	Ser474Ter C>G	CC
NAT2	R/I/S	Slow
PEMT	-744 G>C	GC
PPARG	Pro12Ala C>G	CC
TOMM40	A>G	AG
VERY HIGH		
★ ACE	Ins/Del	DD
★ ACTN3	577 R/X	RR
★ APOE	E2/E3/E4	E3/E4
CETP	G>A	GG
COL12A1	AluI A>G	AA
COMT	Val158Met G>A	GG
CRP	2147 G>A	GG
CYP1B1	Leu432Val C>G	GG
CYP2R1	A>G	GG
ELOVL2	G>C	CC
ELOVL2	T>C	CC
FOXO3	G>T	TT
GDF5	5' UTR C>T	TT
★ GSTM1	INS/DEL	DEL
HNMT	939 A>G	AA
IRS1	C>T	CC
MNSOD	Val16Ala T>C	TT
★ MTHFR	677 C>T	TT
MTNR1B	C>G	CG
PPARGC1A	Gly482Ser G>A	GA

PATHWAY-BASED RESULTS

Leanne Grantland



CELLULAR OVERVIEW

We are the sum of our cells, and we are only as healthy as they are. Every cell in our body functions independently yet is connected to the whole. Like a small apartment inside a high-rise building, each unit takes care of its own day-to-day maintenance, but ultimately contributes to the overall functionality of the building.

3

METHYLATION

★ MTHFR TT

You are likely not methylating efficiently. Ensure intake of B vitamins, choline, and folate (food such as dark leafy greens, eggs, nuts, seeds & wholegrains) to support optimal methylation. Methylation is a biochemical process involved in the production, repair, and behavior of genes and metabolic processes.



1

INFLAMMATION

You are prone to chronic inflammation. Ensuring an anti-inflammatory diet and lifestyle behaviors like intermittent fasting help to reduce your inflammatory potential. Inflammation is a natural immune response to bring about protection & repair. If left unchecked it may lead to chronic health conditions.



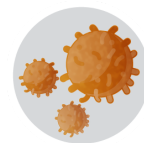
Inflammatory markers

2

OXIDATIVE STRESS

Your ability to manage oxidative stress may be limited. Ensuring daily intake of plant foods rich in antioxidant nutrients, and avoiding pollutants, will help neutralize damage caused by harmful by-products from normal biological functions. Oxidative stress contributes to premature aging and several other diseases.

Destructive oxidisers



4

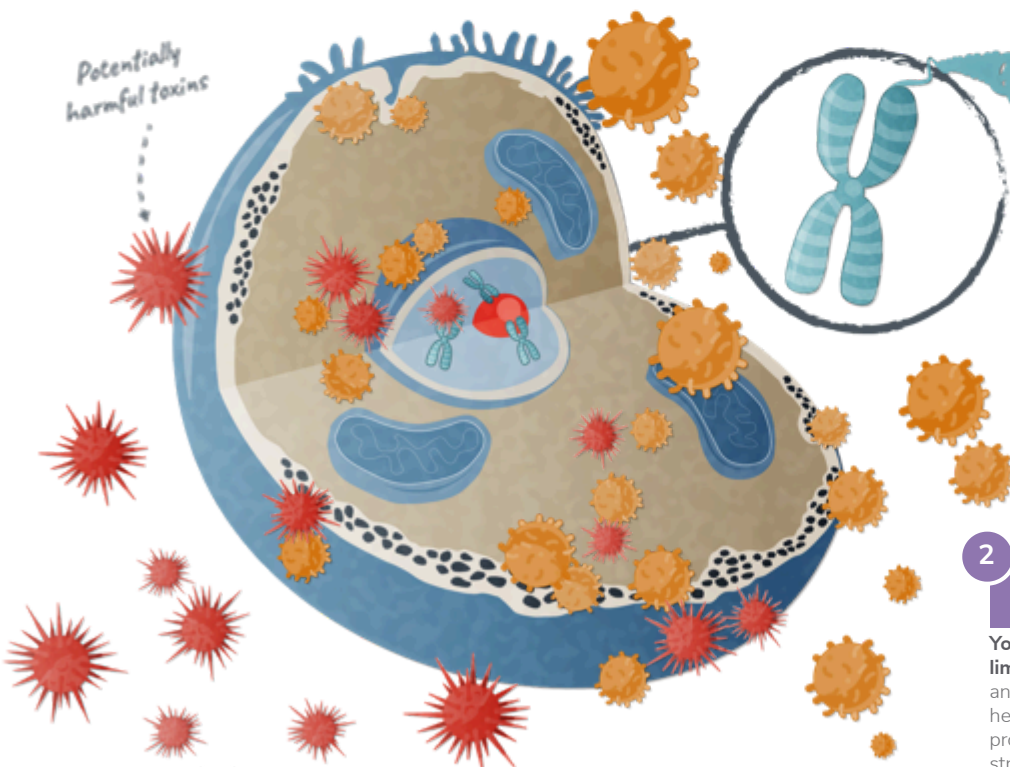
DETOXIFICATION

★ GSTM1 DEL

Your ability to neutralize and remove toxins may be reduced. Include dark green leafy vegetables and those from the broccoli and onion families in your diet, as they support detoxification. Reduce environmental toxin exposures such as chemicals and pesticides, as without optimal detoxification, these pollutants can accumulate in the body and cause significant harm.



Potentially harmful toxins



SYSTEMS & CARDIOVASCULAR OVERVIEW

Inside your body are several highly sophisticated metabolic systems keeping you alive, healthy, and running smoothly. This network is like a complex underground railroad system, where multiple separate but interconnected parts are meticulously organized to keep everything on track, on schedule, and functioning optimally.

6

MOOD & BEHAVIOR

You may be susceptible to mood imbalances. Include B vitamins, minerals, regular exercise, and stress management, in your diet and lifestyle, to help create and maintain the balance of chemicals in the brain required to regulate mood.

3

MEMORY & BRAIN HEALTH

★ APOE E3/E4

Without the right choices, there may be cognitive decline as you age. Prioritize a healthy diet, regular exercise, activities involving hand-eye coordination, and brain games. These assist with maintaining flexibility in the brain, and the ability for learning, processing, remembering, and storing information.

7

HISTAMINE OVERLOAD

You are likely able to breakdown excess histamine. Histamine is produced during an immune response to triggers such as allergens, injury, or toxins, leading to overload if not broken down effectively.

5

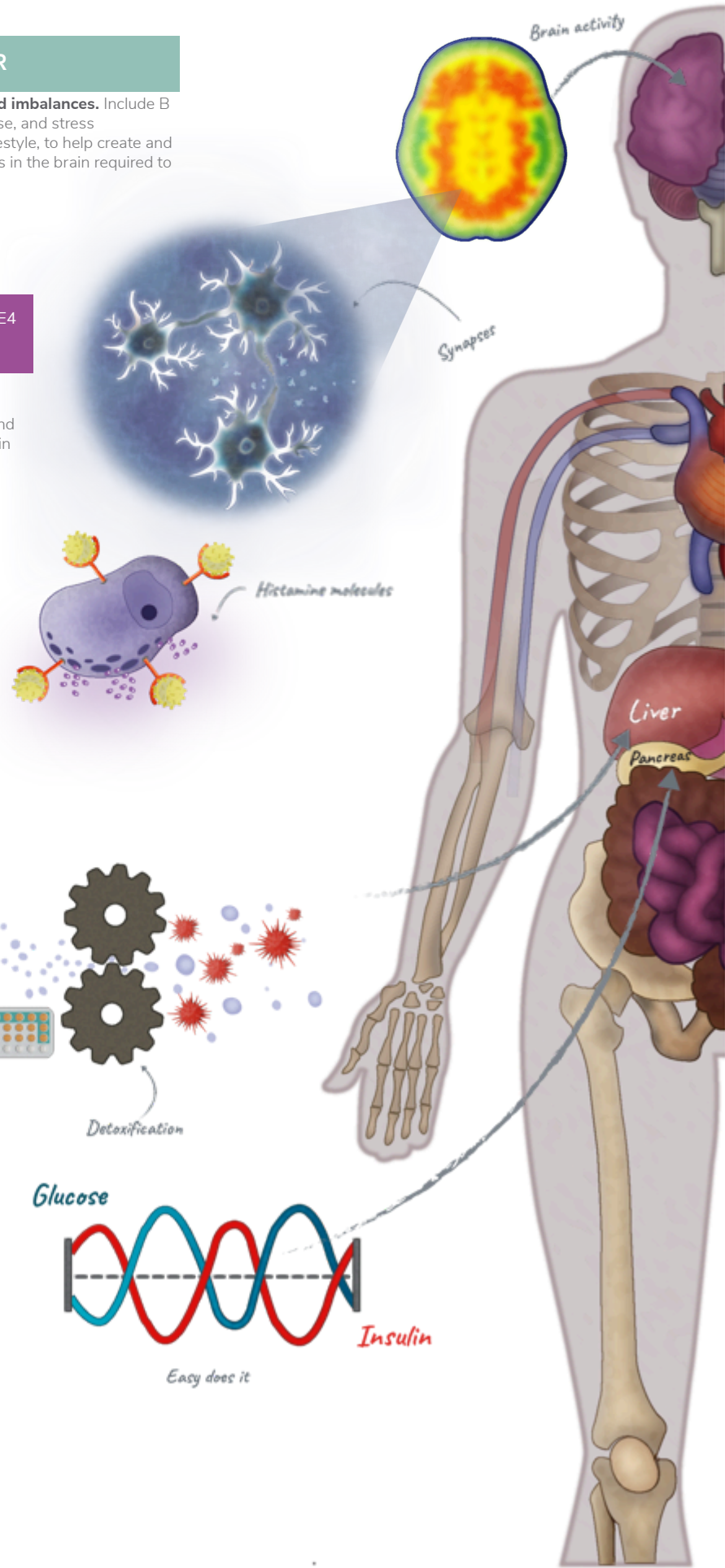
HORMONE BALANCE

Your hormone balance may be impaired. Focus on sleep and stress management, regulate blood sugar, avoid all toxins, and eat vegetables from the broccoli family daily to support your body's ability to balance hormones.

2

GLUCOSE & INSULIN

You are likely prone to blood sugar dysregulation. Eat unrefined high-fiber foods and prioritize the intake of quality proteins, plant fats, and vegetables to support blood sugar regulation. Glucose and insulin production needs to be in balance to prevent damage to cells, systems, and organs.



4 CARDIOVASCULAR HEALTH BLOOD CLOTTING

You likely are not prone to blood clotting. Blood clotting is a survival tactic to prevent uncontrolled bleeding but can cause harm when the formation and breakdown of clots is inappropriate.

3 CARDIOVASCULAR HEALTH CHOLESTEROL

★ APOE E3/E4

You are likely prone to raised cholesterol levels. Prioritize a healthy lifestyle, plant-based fats, generous amounts of vegetables, and a high-fiber diet. Cholesterol metabolism is influenced by how various fats are processed and stored within the blood vessels.

2 CARDIOVASCULAR HEALTH VASCULAR HEALTH

Your blood vessels are likely to be susceptible to damage. Prioritize foods rich in polyphenols, and focus on stress management and regular exercise to support blood vessel health. The integrity of arteries and veins affects blood flow and the development of chronic conditions.

1 CARDIOVASCULAR HEALTH BLOOD PRESSURE

★ ACE DD

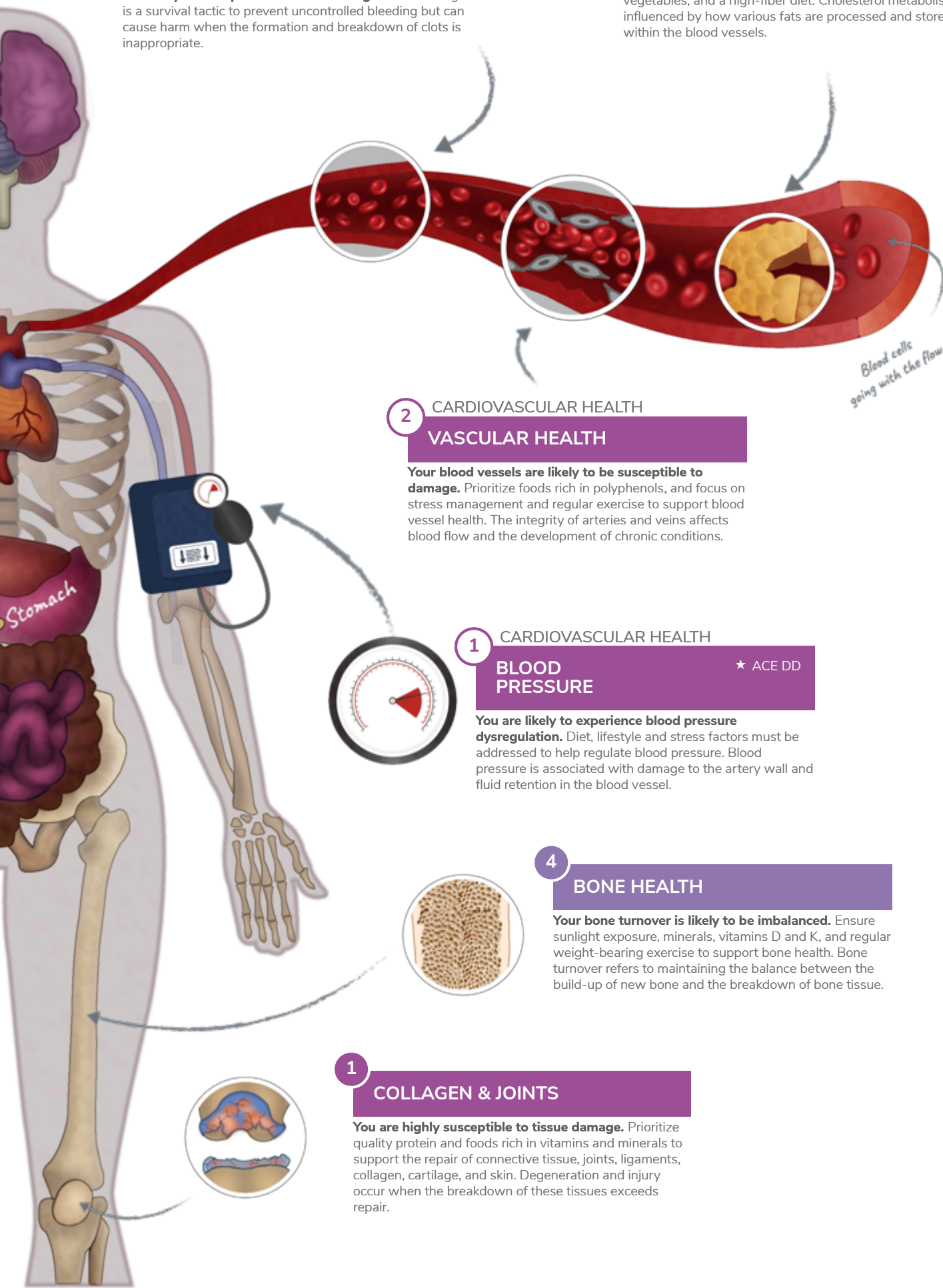
You are likely to experience blood pressure dysregulation. Diet, lifestyle and stress factors must be addressed to help regulate blood pressure. Blood pressure is associated with damage to the artery wall and fluid retention in the blood vessel.

4 BONE HEALTH

Your bone turnover is likely to be imbalanced. Ensure sunlight exposure, minerals, vitamins D and K, and regular weight-bearing exercise to support bone health. Bone turnover refers to maintaining the balance between the build-up of new bone and the breakdown of bone tissue.

1 COLLAGEN & JOINTS

You are highly susceptible to tissue damage. Prioritize quality protein and foods rich in vitamins and minerals to support the repair of connective tissue, joints, ligaments, collagen, cartilage, and skin. Degeneration and injury occur when the breakdown of these tissues exceeds repair.



ENERGY OVERVIEW

How we consume, absorb, distribute, store, and burn the calories we gain from food varies between individuals, largely because of genetic variation. People respond very differently to calories, exercise, fasting, fatigue, etc. Hunger and feeling full is also experienced very differently. Knowing in what way you're hard-wired to manage food can be a powerful way to enable you to work with your body, not against it.

6

APPETITE/SATIETY/INTAKE

You likely don't have an unregulated appetite. Adequate quality protein and regular fiber, as well as mindful eating, contributes to better food choices.



What does it take to get you feeling full?

5

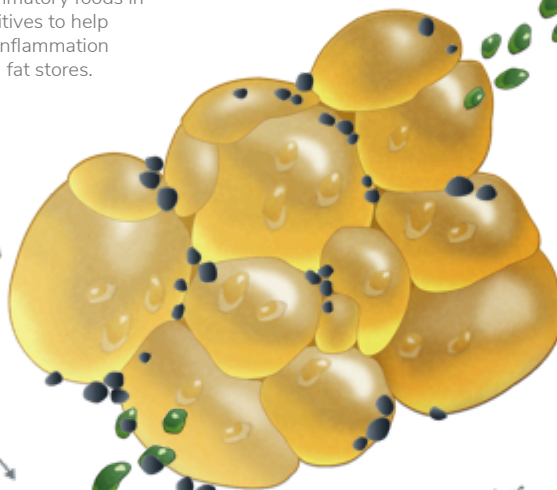
PRO-INFLAMMATORY FAT

Your fat cells are likely not prone to inflammation. It is always a good choice to include anti-inflammatory foods in your diet and to avoid toxins and food additives to help prevent fat cells from becoming inflamed. Inflammation inhibits the efficient release of energy from fat stores.

Fat Cells

Some people have more and bigger fat cells

Energy out



Inflammatory markers stick to excess fat

3

ENERGY EXPENDITURE

Your resting metabolism may be slower than is optimal. Prioritize fat-burning foods such as eggs, green tea, and spices like chili peppers. Also, include regular exercise and strength training to increase metabolism. Resting metabolism refers to the energy needed to carry out important bodily functions.

How many calories do you burn each day

2

EXERCISE RESPONSE

Your fat cells release fuel less efficiently when you exercise. Regular exercise will always play a role in weight management and contributes greatly to general health and well-being. However, prioritizing a quality diet, good sleep, and stress management will be required to enable weight loss.

How effective is exercise?



4

WEIGHT GAIN & WEIGHT LOSS RESISTANCE

You will likely respond to weight management interventions. Consider working with a healthcare practitioner who can provide you with a personalized weight management program, including realistic goals, behavioral change, and regular support.



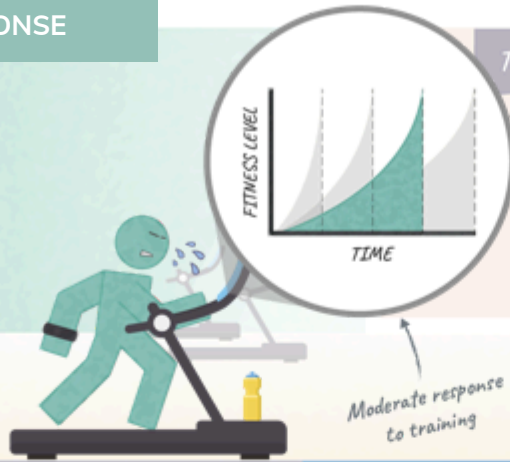
ACTIVITY OVERVIEW

Your genes go a long way in determining how your body responds to exercise. 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 into how you can optimize your training program. Knowing how your body recovers from training will help you achieve your fitness goals in a sustainable way.

4

TRAINING RESPONSE

You likely have a good response to training. Take advantage of your training response potential through a consistent and progressive training program. You will likely have an intermediate baseline fitness to start and experience successive increases in VO2 max.



TRAINING FOR THE RACE

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



1

INJURY

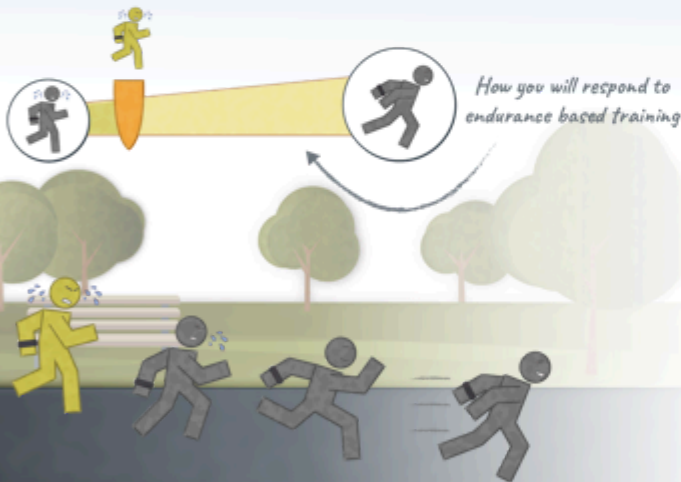
You are very likely prone to soft tissue injuries. Help prevent ligament and tendon injuries by prioritizing exercises that increase range of motion, improve balance, and promote strength. Consult with an exercise specialist to assist.

COMPETING IN THE RACE

5

ENDURANCE

You may take longer to respond to endurance training. Endurance training contributes to general health and well-being. Build your endurance capacity by including a higher proportion of low- to medium-intensity workouts, and gradually increase the frequency and duration of your sessions over time.



3

POWER

★ ACTN3 RR

You have above average power potential and will likely respond well to power training. Promote substantial gains in your power capacity by ensuring your high-intensity sessions are power- and goal-specific. Maximize your gains by following a consistent training plan and ensuring progressive overload.

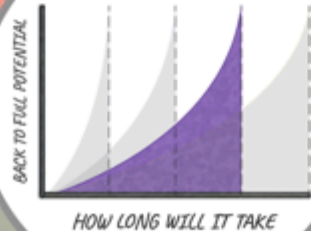


AFTER THE RACE

2

RECOVERY

You likely need daily support to recover from exercise. Prioritize active recovery sessions or rest days. Ensure quality nutrition, protein-rich meals, and uninterrupted sleep after exercise to support recovery.



A little more rest than usual is needed for a good recovery

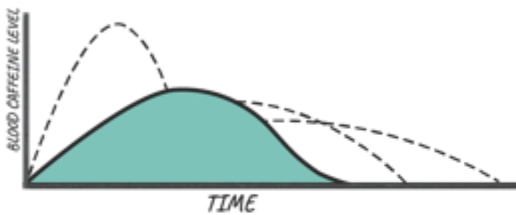
NUTRIENTS OVERVIEW

Vitamins, minerals, and compounds found in food are integral to keeping our body's processes working optimally. They keep our cells robust and efficient, and they support our genes switching on and off as needed. Insights from our genes help us make the best dietary choices by understanding how we respond to certain foods and nutrients.

6

CAFFEINE

The speed by which you metabolize caffeine is **moderate**. You likely feel the effect of caffeine soon after consumption, including its ergogenic benefit. However, when consumed in large amounts, caffeine may negatively impact sleep or mood.



8

IRON OVERLOAD

You do not have an increased genetic tendency for iron overload. This lowers your chances of iron overload, but it's still important to keep your intake balanced to support overall health.

1

FATTY ACIDS

Your ability to optimally metabolize fatty acids is **likely highly reduced**. Prioritize healthy fats, consider omega-3 supplements (if necessary), and avoid unhealthy fats, to optimize fatty acid balance. Fatty acids play many important roles in the body, including in cell membrane structure and function.



4

CHOLINE

You have an **increased requirement for dietary choline**. Ensure you include dietary choline from foods such as eggs and peanuts, and supplements (if required). Choline regulates memory, mood, energy production, and DNA health, and also plays a valuable role in pregnancy and menopause.



3

FOLATE

Your ability to optimally utilize dietary folate is **likely reduced**. Ensure dark green leafy vegetables and beans daily to support your folate levels and consider supplements (if necessary). Folate builds tissues, maintains brain chemicals and blood cells, and ensures DNA health.



7

GLUTEN

You have a low genetic potential to develop gluten induced gut damage. Despite this some individuals may still react poorly to gluten that may impact gut health. If you notice digestive issues, speak with your health care provider to explore other possible causes of gut inflammation.



5

VITAMIN D

You may have a higher requirement for vitamin D. Include sunlight exposure, vitamin D-rich foods, and consider a vitamin D3 supplement (if required) to help support your Vitamin D levels. Vitamin D is a vital nutrient, involved in multiple biochemical pathways essential for heart, bone and brain health.



10

SALT

You are not likely to be sensitive to salt. It is always valuable to know and monitor your blood pressure. There is also value in reducing the intake of processed and pre-prepared foods even when not sensitive to salt.

9

VITAMIN C

You likely do not have an increased demand for vitamin C. Including vitamin C rich foods is still essential for the maintenance of connective tissue, immune health and the removal of toxins.

2

VITAMIN B12

Your ability to absorb and transport vitamin B12 is likely reduced. Ensure the inclusion of animal proteins, focus on gut health, and consider vitamin B12 supplements (if required), to support vitamin B12 levels. B12 impacts the health of all cells and the making of DNA.

PRACTITIONER-DRIVEN PERSONALIZATION

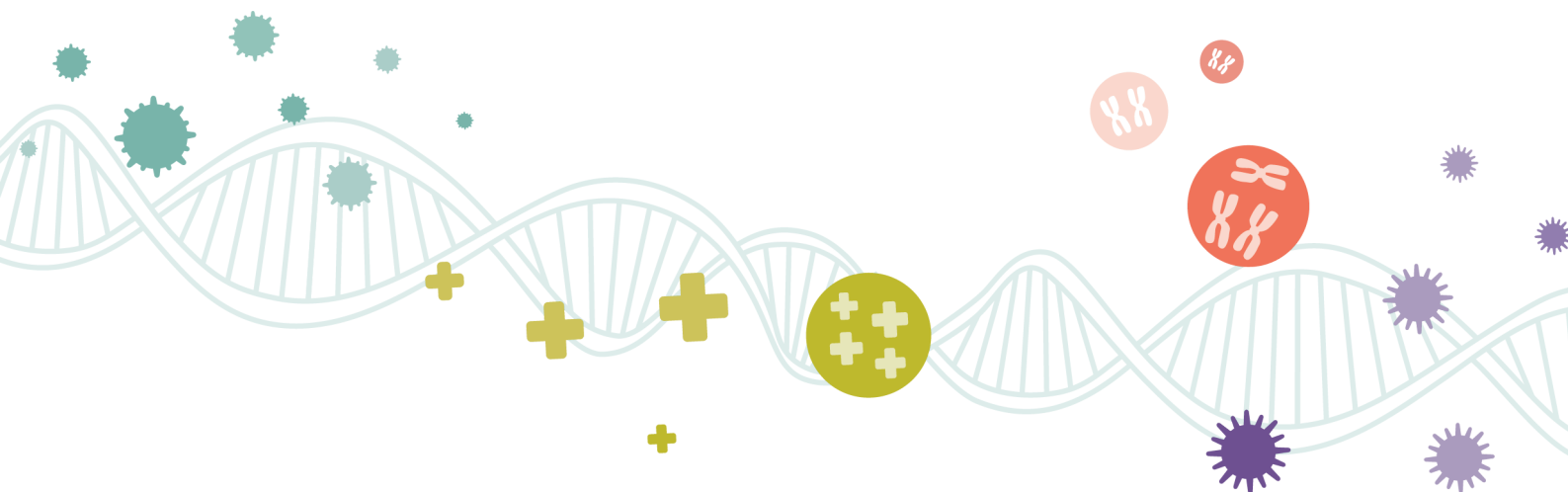
Taking a Deeper Dive into your Genes

Whether you want to live your most optimal life, manage your weight better, prevent or manage a chronic condition, or improve your athletic performance, your 3X4 Blueprint will help get you there.

Your genetic results provide an important piece of the puzzle, but a deeper and fuller picture begins to emerge when your genetic insights are combined with your medical history, unique diet, lifestyle, and exercise preferences, all in the hands of an expert genetic practitioner.

If you are looking for a detailed action plan, and deeper insights into your gene results, 3X4 has an extensive network of practitioners who are ready to guide you.

Use our [practitioner locator](#) to find a practitioner who can help you reach your goals.





ADIPOGENESIS | HIGH

ENERGY

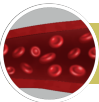
The formation, storage, and release of fat cells are affected by variability in our genes. These gene variations may be partly responsible for why some people find it easy to gain or lose weight compared to others, even though their diet and lifestyles are similar. How our fat cells release energy is 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 | VERY HIGH

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 | MEDIUM

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

Leanne Grantland



CHOLESTEROL | VERY HIGH

CARDIOVASCULAR HEALTH

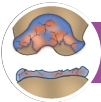
Cholesterol metabolism refers to processes that determine the distribution of lipids in the body. Fats bind to proteins that transport them in the bloodstream between organs. Different forms of fat particles have important roles to play as part of cell membrane structures and as precursors for hormones. 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 | HIGH

NUTRIENTS

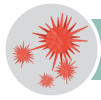
Choline is a vitamin that plays an important role in the building of cell membranes. It is a key nutrient for a healthy pregnancy, mood regulation, memory and making new DNA. It is also involved in fat transport and supports methylation. Certain genes may affect the availability of choline, increasing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



COLLAGEN & JOINTS | VERY 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 | MEDIUM

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 | LOW

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.



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 | VERY HIGH

NUTRIENTS

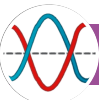
Fatty acids are the building blocks of fats and perform many important functions in the body. They are the base for cell membranes, help make hormones, are involved in inflammation, brain function and the immune system. Different dietary fats impact the body in different ways and our genes impact how 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

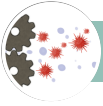
Gluten which is the protein found in wheat, barley, triticale and rye can, under specific circumstances cause inflammation in the gut which may damage the gut wall and potentially lead to complications resulting in nutrient deficiencies. If certain genes variants are present, gluten may need to be removed 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.



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

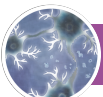
Injuries are caused by many internal and external factors. A torn tissue or chronic overuse of muscles, tendons or ligaments does not affect everyone in the same way, or necessarily result in injury. The combination of your body's make-up and genetics contribute to the development of injuries. Knowing 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 can result in the damage of organs.



MEMORY & BRAIN HEALTH | VERY HIGH

SYSTEMS

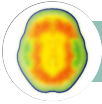
The brain is the control center of the body, and keeping it healthy is crucial for overall mental and physical health. Apart from regulating all of your hormones and other biological processes, the brain is also responsible for cognitive function, including attention, focus, learning capacity, and memory. 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 | HIGH

CELLULAR

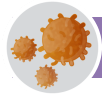
Methylation is the biochemical process of making sure every cell is functioning optimally. Methylation is not just responsible for how we repair genetic material, but also how we make energy, respond to stress, handle inflammation, how well our cells detoxify, and how our brain chemistry works. Methylation 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.



MOOD & BEHAVIOR | MEDIUM

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 | HIGH

CELLULAR

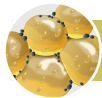
Oxidative stress is the human equivalent of rusting. The impact of all exposures over time results in damage to our cells. Unmanaged, oxidation can impact on our energy levels, memory, premature aging and sometimes cancer risk. In a healthy functioning cell, enzymes that counteract oxidative damage, 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 | HIGH

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 | LOW

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 pro-inflammatory molecules increase. Obesity-induced inflammation can be managed by losing excess weight, which reduces adipokines.



RECOVERY | HIGH

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 | LOW

NUTRIENTS

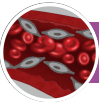
Salt sensitivity is estimated to be present in 51% of individuals with high blood pressure and 26% with normal blood pressure. In individuals with salt sensitivity, blood pressure may increase when excess sodium is consumed. Although the mechanisms underlying salt sensitivity are complex, your genes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



TRAINING RESPONSE | MEDIUM

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 | VERY HIGH

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 | 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 byproducts 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 | MEDIUM

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

Leanne Grantland

3X4 builds Pathways by grouping together genes that together impact a specific metabolic area. Provided are your gene results, grouped by the Pathways they appear in. Both the Pathways and the Gene Results are color-coded, with purple having the highest impact, and light green the lowest impact. Genes with the most significant impact are indicated with a star ★, and genes with a protective impact are indicated with a shield 🛡️.

CELLULAR

INFLAMMATION	1	OXIDATIVE STRESS	2	METHYLATION	3	DETOXIFICATION	4
APOE E2/E3/E4	E3/E4	APOE E2/E3/E4	E3/E4	★ MTHFR 677 C>T	TT	★ GSTM1 INS/DEL	DEL
FOXO3 G>T	TT	MNSOD Val16Ala T>C	TT	NBPF3 T>C	CC	NAT2 R//S	Slow
CRP 2147 G>A	GG	PPARGC1A Gly482Ser G>A	GA	MTRR 66 A>G	AG	CYP1B1 Leu432Val C>G	GG
CYP1B1 Leu432Val C>G	GG	GSTM1 INS/DEL	DEL	PEMT -744 G>C	GC	MNSOD Val16Ala T>C	TT
MNSOD Val16Ala T>C	TT	PPARG Pro12Ala C>G	CC	CBS 699 C>T	CT	MTHFR 677 C>T	TT
SIRT1 994 T>C	TT	HO-1 -413 A>T	AT	TCN2 776 C>G	CG	CYP2C9 Arg144Cys C>T	TT
ENOS Glu298Asp G>T	GT	ENOS Glu298Asp G>T	GT	BHMT Arg239Glu G>A	GG	GSTP1 Ile105Val A>G	AG
HO-1 -413 A>T	AT	GSTP1 Ile105Val A>G	AG	CHDH T>G	TT	CYP17A1 34 T>C	TC
FADS1 592 G>T	GT	🛡️ UCP2 -866 G>A	GA	COMT Val158Met G>A	GG	CYP1A2 -163 A>C	AC
PPARA 89204 G>C	GC	🛡️ UCP3 -55 C>T	CT	MTHFD1 1958 G>A	GG	ALDH2 Glu504Lys G>A	GG
CYP1A1 Ile462Val A>G	AA	ALDH2 Glu504Lys G>A	GG	MTHFR 1298 A>C	AA	COMT Val158Met G>A	GG
DAO His645Asp C>G	CC	GPX1 Pro198Leu C>T	CC	MTR 2756 A>G	AA	CYP1A1 Ile462Val A>G	AA
FUT2 Trp153Ter G>A	GA	GSTO2 Asn142Asp A>G	AA	NQO1 Pro187Ser C>T	CC	CYP1B1 Asn453Ser A>G	AA
HLA DQ 2.2/2.5/8	DQ2.2/DQ2.2	GSTT1 INS/DEL	INS	OGG1 Ser326Cys C>G	CG	CYP2C19 *1/*2/*17	*1/*1
HNMT Thr105Ile C>T	CC	HFE C282Y/H63D	CC/HD			CYP2C9 Ile359Leu A>C	AA
IL-1 +/-	-	NQO1 Pro187Ser C>T	CC			CYP3A4 -392 A>G	AA
IL-6 -174 G>C	GG	OGG1 Ser326Cys C>G	CG			EPHX1 Tyr113His T>C	TT
IL-6R Asp358Ala A>C	AA	PON1 Gln192Arg A>G	AA			GSTO2 Asn142Asp A>G	AA
SLC22A5 G>A	GG	TNFA -308 G>A	GG			GSTP1 Ala114Val C>T	CC
TIMP4 -55 T>C	CT	UCP1 -3826 A>G	AA			GSTT1 INS/DEL	INS
TNFA -238 G>A	GG					NAT1 Arg187Gln G>A	GG
TNFA -308 G>A	GG					NQO1 Pro187Ser C>T	CC
						PON1 Gln192Arg A>G	AA
						SULT1A1 Arg213His G>A	GG

GENES BY PATHWAY

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SYSTEMS

COLLAGEN & JOINTS	1	GLUCOSE & INSULIN	2	MEMORY & BRAIN HEALTH	3	BONE HEALTH	4
GDF5 5' UTR C>T	TT	PPARGC1A Gly482Ser G>A	GA	★ APOE E2/E3/E4	E3/E4	CYP2R1 A>G	GG
COL12A1 AluI A>G	AA	MTNR1B C>G	CG	COMT Val158Met G>A	GG	GDF5 5' UTR C>T	TT
COL3A1 Ala698Thr G>A	AA	IRS1 C>T	CC	MTHFR 677 C>T	TT	VDR Bsm1 G>A	GA
MMP1 -1607 1G/2G	1G/2G	PPARG Pro12Ala C>G	CC	MNSOD Val16Ala T>C	TT	DIO2 Thr92Ala T>C	TC
VEGFA -2578 C>A	CA	FOXO1 A>G	GG	ENOS Glu298Asp G>T	GT	♥ TIMP4 -55 T>C	CT
COL1A1 1546 G>T	GG	ADIPOQ -11391 G>A	GG	♥ TOMM40 A>G	AG	COL1A1 1546 G>T	GG
MMP3 A>G	AA	TCF7L2 IVS3 C>T	CT	BDNF Val66Met G>A	GG	VDR Fok1 T>C	CC
		DIO2 Thr92Ala T>C	TC	IL-6R Asp358Ala A>C	AA	VDR Taq1 T>C	TC
		FTO 87653 T>A	TA	MTHFR 1298 A>C	AA		
		FABP2 Ala54Thr G>A	GA	MTR 2756 A>G	AA		
		ADRB2 Gln27Glu C>G	CG	NQO1 Pro187Ser C>T	CC		
		ADRB2 Arg16Gly A>G	AG				
		CETP Taq1B G>A	GA				
		PPARA 89204 G>C	GC				
		♥ UCP2 -866 G>A	GA				
		ADIPOQ -395 G>A	GG				
		APOA2 -492 T>C	TC				
		FOXO3 G>T	TT				
		SLC2A2 Thr110Ile C>T	CC				
		TNFA -308 G>A	GG				

GENES BY PATHWAY

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SYSTEMS

HORMONE BALANCE	5	MOOD & BEHAVIOR	6	HISTAMINE OVERLOAD	7
CYP1B1 Leu432Val C>G	GG	MTHFR 677 C>T	TT	HNMT 939 A>G	AA
GSTM1 INS/DEL	DEL	DRD3 Ser9Gly C>T	CT	DAO C>T	CC
CYP19A1 C>T	TT	DRD1 -48 G>A	GA	DAO His645Asp C>G	CC
MNSOD Val16Ala T>C	TT	5HT2A 102 C>T	CT	HNMT Thr105Ile C>T	CC
MTHFR 677 C>T	TT	5HT2A -1438 G>A	GA		
UGT2B15 T>G	TG	5HT2A His452Tyr C>T	CT		
GSTP1 Ile105Val A>G	AG	CHRNA5 Asp398Asn G>A	GA		
CYP17A1 34 T>C	TC	OXR A>G	AG		
COMT Val158Met G>A	GG	DRD4 -521 C>T	CT		
CYP1A1 Ile462Val A>G	AA	CACNA1C G>A	GA		
CYP1B1 Asn453Ser A>G	AA	AKT1 G1172+23A T>C	TC		
CYP2C19 *1/*2/*17	*1/*1	CHRNA5 C>T	CT		
CYP3A4 -392 A>G	AA	ANK3 318473 C>T	CT		
EPHX1 Tyr113His T>C	TT	ANK3 A>G	AG		
ESR2 1730 G>A	GG	ANKK1/DRD2 TaqIA C>T	CC		
GSTT1 INS/DEL	INS	BDNF Val66Met G>A	GG		
NQO1 Pro187Ser C>T	CC	COMT Val158Met G>A	GG		
SHBG -68 G>A	GG	DRD1 -94 G>A	GG		
SHBG Pro185Leu C>T	CC	FAAH Pro129Thr C>A	CC		
SRD5A1 A>G	AA	GABRA2 Lys132Lys A>G	AA		
SULT1A1 Arg213His G>A	GG	GAD1 83-218C>T	CT		
UGT2B17 INS/DEL	INS	HTR1A -1019 C>G	CC		
		MAOA Arg297Arg G>T	GT		
		MTHFR 1298 A>C	AA		
		MTR 2756 A>G	AA		
		OPRM1 Asn40Asp A>G	AA		

GENES BY PATHWAY

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CARDIOVASCULAR HEALTH

BLOOD PRESSURE	1	VASCULAR HEALTH	2	CHOLESTEROL	3	BLOOD CLOTTING	4
★ ACE Ins/Del	DD	ACE Ins/Del	DD	★ APOE E2/E3/E4	E3/E4	ENOS Glu298Asp G>T	GT
ACE2 7132 T>C	TT	APOE E2/E3/E4	E3/E4	CETP G>A	GG	F2 20210 G>A	GG
AGT Met235Thr A>G	AG	CRP 2147 G>A	GG	LPL Ser474Ter C>G	CC	F5 Arg506Gln G>A	GG
AGTR1 1166 A>C	AC	MTHFR 677 C>T	TT	IL-6 -174 G>C	GG	HPA-1 T>C	TT
ENOS Glu298Asp G>T	GT	LPL Ser474Ter C>G	CC	CETP Taq1B G>A	GA		
ACE2 A>G	AA	TOMM40 A>G	AG	FABP2 Ala54Thr G>A	GA		
REN C-531T C>T	CC	AGT Met235Thr A>G	AG	APOA5 -1131 T>C	TT		
		ENOS Glu298Asp G>T	GT	APOA5 C>A	CC		
		HO-1 -413 A>T	AT	APOC3 3175 C>G	CC		
		CETP Taq1B G>A	GA	TNFA -238 G>A	GG		
		PPARA 89204 G>C	GC				
		ALDH2 Glu504Lys G>A	GG				
		APOA5 -1131 T>C	TT				
		F2 20210 G>A	GG				
		F5 Arg506Gln G>A	GG				
		HPA-1 T>C	TT				
		IL-6 -174 G>C	GG				
		MTHFR 1298 A>C	AA				
		OGG1 Ser326Cys C>G	CG				
		VEGF -634 G>C	GG				

GENES BY PATHWAY

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ENERGY

ADIPOGENESIS	1	EXERCISE RESPONSE	2	ENERGY EXPENDITURE	3
PPARGC1A Gly482Ser G>A	GA	LEPR Lys656Asn G>C	GG	PPARGC1A Gly482Ser G>A	GA
ADRB2 Gln27Glu C>G	CG	ADRB2 Gln27Glu C>G	CG	ADRB2 Arg16Gly A>G	AG
ADRB2 Arg16Gly A>G	AG	ADRB2 Arg16Gly A>G	AG	ADRB3 Trp64Arg T>C	TC
ADRB3 Trp64Arg T>C	TC	FTO 87653 T>A	TA	ADRB2 Gln27Glu C>G	CG
FABP2 Ala54Thr G>A	GA	LEPR Gln223Arg A>G	AG	FTO 87653 T>A	TA
MMP2 Gly226Gly G>C	GG	ADRB3 Trp64Arg T>C	TC	LEPR Gln223Arg A>G	AG
PLIN 11482 G>A	GG	CLOCK 3111 T>C	TT	LEPR Lys109Arg A>G	AG
PPARG Pro12Ala C>G	CC	LEPR Lys109Arg A>G	AG	UCP2 -866 G>A	GA
		MC4R T>C	TT	UCP3 -55 C>T	CT
				CLOCK 3111 T>C	TT
				LEPR Lys656Asn G>C	GG
				MC4R T>C	TT
				UCP1 -3826 A>G	AA

GENES BY PATHWAY

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ENERGY

WEIGHT GAIN & WEIGHT LOSS RESISTANCE	4	PRO-INFLAMMATORY FAT	5	APPETITE/SATIETY/INTAKE	6
ADIPOQ -11391 G>A	GG	CRP 2147 G>A	GG	FTO 87653 T>A	TA
FTO 87653 T>A	TA	ADIPOQ -11391 G>A	GG	LEPR Gln223Arg A>G	AG
ADRB3 Trp64Arg T>C	TC	ADIPOQ -395 G>A	GG	TAS2R38 Ala262Val C>T	CT
LEPR Gln223Arg A>G	AG	IL-1 +/-	-	LEPR Lys109Arg A>G	AG
ADRB2 Gln27Glu C>G	CG	IL-6 -174 G>C	GG	ANKK1/DRD2 TaqIA C>T	CC
TCF7L2 IVS3 C>T	CT	IL-6R Asp358Ala A>C	AA	APOA2 -492 T>C	TC
ADRB2 Arg16Gly A>G	AG	TNFA -238 G>A	GG	CLOCK 3111 T>C	TT
LEPR Lys109Arg A>G	AG	TNFA -308 G>A	GG	FAAH Pro129Thr C>A	CC
FABP2 Ala54Thr G>A	GA			LEPR Lys656Asn G>C	GG
LEPR Lys656Asn G>C	GG			MC4R T>C	TT
UCP2 -866 G>A	GA			SLC2A2 Thr110Ile C>T	CC
UCP3 -55 C>T	CT				
ADIPOQ -395 G>A	GG				
APOA2 -492 T>C	TC				
APOA5 -1131 T>C	TT				
CLOCK 3111 T>C	TT				
MC4R T>C	TT				
MMP2 Gly226Gly G>C	GG				
PLIN 11482 G>A	GG				
PPARG Pro12Ala C>G	CC				
UCP1 -3826 A>G	AA				

GENES BY PATHWAY

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ACTIVITY

INJURY	1	RECOVERY	2	POWER	3
GDF5 5' UTR C>T	TT	CRP 2147 G>A	GG	★ ACTN3 577 R/X	RR
COL12A1 AluI A>G	AA	MNSOD Val16Ala T>C	TT	IL-6 -174 G>C	GG
COL3A1 Ala698Thr G>A	AA	GPX1 Pro198Leu C>T	CC	ACE Ins/Del	DD
VEGFA -2578 C>A	CA	IL-1 +/-	-	PPARA 89204 G>C	GC
COL1A1 1546 G>T	GG	IL-6 -174 G>C	GG	ADRB2 Arg16Gly A>G	AG
MMP3 A>G	AA	IL-6R Asp358Ala A>C	AA	NOS3 -786 T>C	TC
TNFA -308 G>A	GG	TNFA -308 G>A	GG	AGTR2 A>C	CC
				AMPD1 133 C>T	CC
				CKM NcoI T>C	TT
				HIF1A Pro582Ser C>T	CC

TRAINING RESPONSE	4	ENDURANCE	5
GSTP1 Ile105Val A>G	AG	AGTR2 A>C	CC
✶ PPARGC1A Gly482Ser G>A	GA	CKM NcoI T>C	TT
ACE Ins/Del	DD	PPARA 89204 G>C	GC
ACSL1 T>C	CC	ADRB2 Arg16Gly A>G	AG
AMPD1 133 C>T	CC	ACE Ins/Del	DD
CKM NcoI T>C	TT	ACTN3 577 R/X	RR
HIF1A Pro582Ser C>T	CC	NRF2 A>G	AA
NRF2 A>G	AA	PPARD 294 T>C	TC
VEGF -634 G>C	GG	PPARGC1A Gly482Ser G>A	GA
		VEGFR2 His472Gln T>A	TT

GENES BY PATHWAY

Leanne Grantland

NUTRIENTS

FATTY ACIDS	1	VITAMIN B12	2	FOLATE	3	CHOLINE	4
ELOVL2 G>C	CC	FUT2 Gly258Ser G>A	GA	MTHFR 677 C>T	TT	PEMT -744 G>C	GC
ELOVL2 T>C	CC	TCN2 776 C>G	CG	TCN2 776 C>G	CG	BHMT Arg239Glu G>A	GG
FADS1 592 G>T	GT			MTHFD1 1958 G>A	GG	CHDH T>G	TT
FADS2 C>G	CG			MTHFR 1298 A>C	AA	MTHFD1 1958 G>A	GG
APOA2 -492 T>C	TC						

VITAMIN D	5	CAFFEINE	6	GLUTEN	7
CYP2R1 A>G	GG	NAT2 R/I/S	Slow	HLA DQ 2.2/2.5/8	DQ2.2/DQ2.2
VDR Bsm1 G>A	GA	CYP1A2 -163 A>C	AC		
GC A>C	AA	COMT Val158Met G>A	GG		
VDR Fok1 T>C	CC				
VDR Taq1 T>C	TC				

IRON OVERLOAD	8	VITAMIN C	9	SALT	10
HFE C282Y/H63D	CC/HD	GSTO2 Asn142Asp A>G	AA	ACE Ins/Del	DD
		SLC23A1 790 G>A	GG	AGT Met235Thr A>G	AG

