



DNA *pal*

Your DNA-based Diet & Lifestyle Prescription

Table of Contents

Pillars

1. Digestion.....Pg. 6-7

Gluten intolerance
Lactose intolerance
GI infections

2. Metabolism.....Pg. 8-9

Appetite control
BMI
Insulin secretion
Obesity
Type 2 diabetes

3. Stress.....Pg. 10-11

Blood pressure
Cortisol
Mood disorders
Prolonged stress response

4. Immunity.....Pg. 12-13

Allergies
Histamine
Inflammation

5. Nutrients.....Pg. 14-16

Carbohydrates
Fats
Methylation
Omega-3 Fats

Protein
Vitamin B9 (folate)
Vitamin B12
Vitamin D

6. Stimulants.....Pg. 17-18

Alcohol detoxification
Caffeine metabolism
Caffeine sensitivity

7. Exercise.....Pg. 19-20

Endurance vs power
Injury
Recovery
VO2Max

8. Sleep.....Pg. 21-22

Circadian rhythms
Early bird/ night owl
Melatonin receptivity

Genes

ACE.....Pg.11&20
ADH1B.....Pg.18
ADORA2A.....Pg.18
CLOCK.....Pg.22
COL1A1.....Pg.20
COMT.....Pg.11
CYP1A2.....Pg.18
DAO.....Pg.13
FKBP5.....Pg.11
FTO.....Pg.9&16
FUT2.....Pg.7&15
GSTM1.....Pg.20
HLA-DQA1.....Pg.7
HNMT.....Pg.13
LCT (MCM6).....Pg.7
LEPR.....Pg.9
MTHFR.....Pg.15
MTNR1B.....Pg.22
NOS3.....Pg.16
PER3.....Pg.22
TCF7L2.....Pg.9&16
TNF-alpha.....Pg.13
VDR.....Pg.15

Understanding your genetic report

What is DNA?

DNA is your body's instruction manual, controlling every single function from when you were only made up of a few cells, until now. It looks like a twisted ladder, made up of two halves - you inherit one half from your mother, the other from your father. This combination is what makes you, you.




Each 'rung' of the ladder contains two 'letters' of DNA code called **nucleotides** which bond together in pairs: **A (adenine)** and **T (thymine)** bond together, as do **C (cytosine)** and **G (guanine)**.

Genes are portions of the ladder which use combinations of the nucleotide code to perform specific functions.

Results

Your results are shown by a combination of the letters **ATCG** along with a traffic light system to indicate if your result is good, neutral or bad.

Identical letters (e.g. GG or AA) mean you are either what is called the "**wild type**" with no genetic variants (SNPs) OR you have **both** genetic variants (from both parents). A combination of letters (e.g. AG) means you have one inherited genetic variant.

-  A green result indicates either no variants or a positive genetic variant
-  An amber result usually indicates one genetic variant present and a mildly negative impact
-  A red result indicates a negative impact either due to both variants being present or a "wild type" result that is not as beneficial as the variant

SNPs

Over time, due to environmental and lifestyle factors, minor changes called **single nucleotide polymorphisms (SNPs)** occur in the DNA code and are passed down from parent to child, from generation to generation. Remember the nucleotides? Well, a C might be replaced by a T, changing the instructions given to a gene.

Some changes are positive, making us stronger and more resilient (like being able to digest milk after infancy), some negative (like being likely to store more fat as a result of past famine or food shortage) and some make no difference at all. SNPs can be passed down on just one side of your ladder, from one parent, or from both, enhancing the effect.

SNPs are generally what we are looking for when we test your DNA.

Example of your genetic results table:

GENE DESCRIPTION	RESULT	IMPACT & ADVICE
GENE CODE - Gene Effect Explanation of the role the gene plays and what effect genetic variants might have, symptoms etc.	GG	An explanation of your result, how you might be affected along with specific diet and lifestyle advice
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8 Pillars of Health & Wellbeing

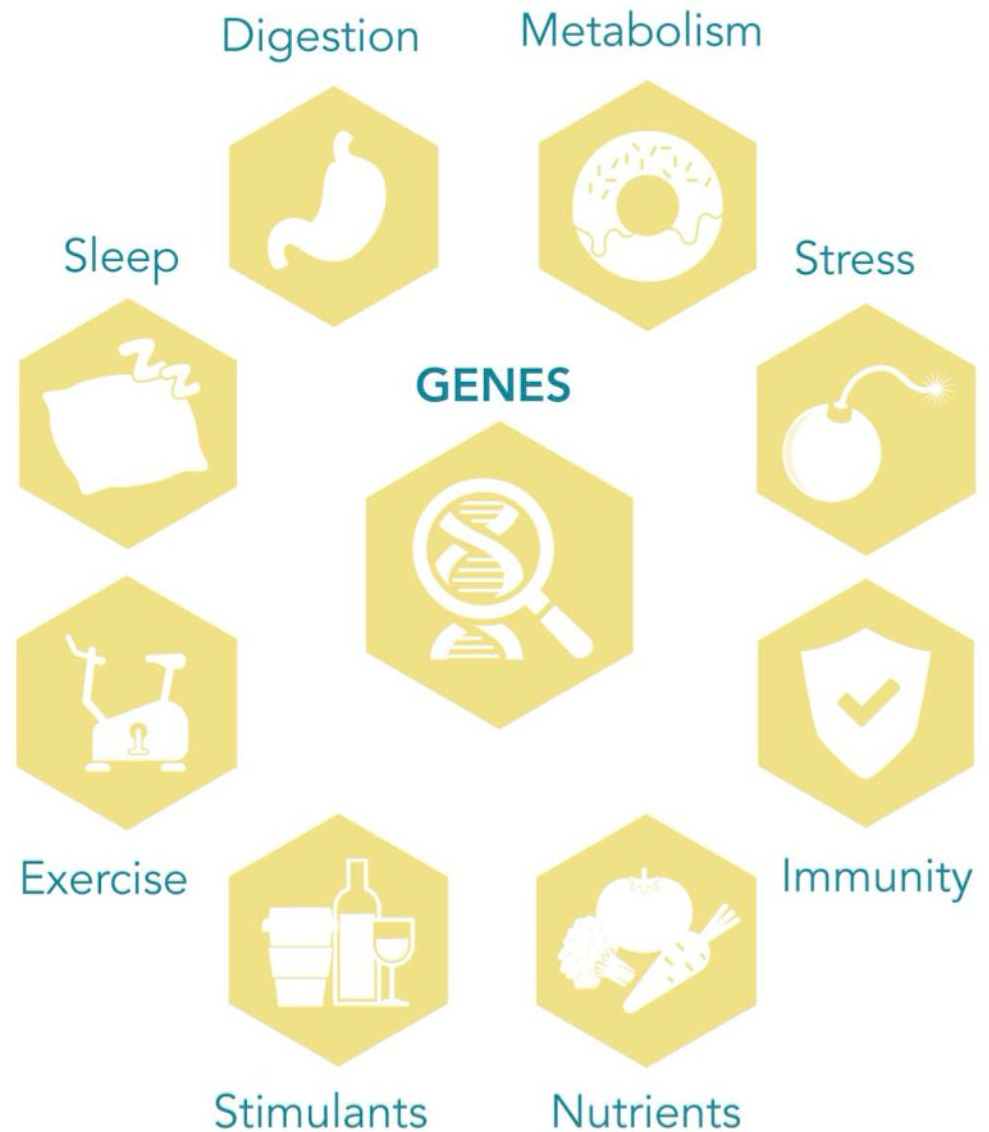
Welcome to your unique DNA-based diet and lifestyle prescription. Please be assured that your genes are **NOT** your destiny. There is a two-way interaction between your DNA and your lifestyle. Many health concerns can be reversed and/or prevented by assessing risk factors and implementing appropriate nutrition and lifestyle measures.

In this report we examine your personal genetic profile within the context of 8 pillars of health and wellbeing: **digestion, metabolism, stress, immunity, nutrients, stimulants, exercise and sleep.**

Our advice is based on your specific genotype in each of these areas. We have also supplied a separate **Nutrition & Lifestyle Guide (NLG)** designed to help you make the most out of the advice given.

We invite you to come along on this journey to reaching optimal health and wellbeing - one **YOU** can be in control of.

Let's get started!



Summary

1: Digestion



FUT2: Secretor
HLA-DQA1: Mild risk of Celiac Disease
LCT/ MCM6: Lactose intolerant

2: Metabolism



TCF7L2: Risk of reduced insulin production
LEPR: Prone to overeat
FTO: Less prone to excess calorie intake, reducing risk of obesity

3: Stress



COMT: Worrier type. Slower breakdown of stress hormones.
FKBP5: Reduced resilience to negative life events
ACE: Impaired blood pressure regulation

4: Immunity



TNFA: Healthy inflammatory response
HNMT: Normal histamine levels
DAO: Mild risk of sensitivity to high histamine foods

5: Nutrients



MTHFR: Increased need for folate (vitamin B9)
FUT2: Susceptible to low vitamin B12 levels
VDR: Normal vitamin D receptivity

6: Nutrients



FTO: Protein recommendation: 0.8g x your weight (kgs)
TCF7L2: Consume less than 40% of daily energy from complex carbs
NOS3: Normal need for omega 3

7: Stimulants



CYP1A2: Caffeine sensitive
ADORA2A: Caffeine may affect sleep
ADH1B: Not alcohol sensitive

8: Exercise



ACE: Suited to weight and strength training
COL1A1: No Result
GSTM1: Increased antioxidant need

9: Sleep



CLOCK: Night owl
PER3: Delayed "body clock" timing
MTNR1B: Reduced receptivity to melatonin



Pillar 1: Digestion

Have a gut feeling? How about “trusting your gut”?

Most often we only pay attention when our digestive system acts up - such as feeling queasy, bloated, 'gassy' or constipated.

Healthy digestion is one of the most crucial factors for overall health. It ensures we absorb vital nutrients from the food we eat and get rid of the waste created in the process. The gut is also one of our main sites of immunity, it's our main line of defence against the outside world, and is also where the majority of our serotonin (feel-good chemical) is made!

There is a two-way communication system between the mind and the body known as the 'gut-brain axis' which is why poor digestive health can impact your mood and mental state. As they say, you are what you eat!

See pages 3 - 7 of your NLG for more information & tips on gut health.



The **FUT2** gene is involved in susceptibility to certain viral, bacterial and yeast (microbial) infections and balance in the digestive tract. Your digestive health can also be impacted by intolerance to components in food such as gluten and lactose, influenced by the **HLA** and **LCT** genes respectively, causing damage to the intestinal lining and knock-on digestive and immune problems. Check page 7 below to see if you have any of these genetic variants that could be disrupting your health!

Your digestion genotype and advice:

GENE DESCRIPTION	YOUR RESULT	IMPACT & ADVICE
<p>FUT2 - Gastrointestinal (GI) Infections</p> <p>FUT2 is highly expressed in the GI tract and is involved in immune regulation via secretions. People with normal FUT2 are 'Secretors', whereas those with variants on FUT2 are 'Non-secretors'. There are advantages and disadvantages to both Secretor and Non-secretor status in terms of susceptibility to viral, bacterial and fungal infections, as well as microbial balance. The W143X variant is the most common indicator of Secretor status in Non-East Asian populations.</p>	AG	<p>Secretor (Non-East Asian Populations). More resistant to candida (yeast) infections and to inflammatory bowel disease (IBD), specifically Crohn's Disease. On the other hand, secretors have been shown to be more susceptible to rotavirus and norovirus infections (which cause diarrhea & vomiting), and H. pylori (a bacteria), known to irritate the stomach lining, causing inflammation and stomach ulcers. See pages 3 & 7 of your Nutrition & Lifestyle Guide (NLG) for more information on Gut Healing and Candida.</p>
<p>HLA-DQA1 - Gluten Intolerance</p> <p>The HLA genes help the immune system distinguish between the body's own proteins and proteins made by foreign invaders (such as viruses and bacteria). Genetic variants are associated with increased susceptibility to auto-immune conditions, particularly celiac disease - a condition where the immune system becomes abnormally sensitive to gluten (a naturally occurring protein found in wheat, barley and rye). A family history of celiac disease or other autoimmune conditions increases risk.</p>	TC	<p>You are among the 8% of the population at elevated risk of celiac disease (CD). A family history of CD and/or other autoimmune conditions in the presence of symptoms such as chronic bowel upsets, joint pain, inflammation and migraines after consuming gluten products is a strong indication of CD. Consider avoiding gluten completely (pg. 5 NLG). You may also want to try following a gut healing protocol (pg. 3 NLG) to encourage healing of the stomach lining.</p>
<p>LCT/ MCM6 - Lactose Intolerance</p> <p>Controls the levels of an enzyme called lactase needed to digest lactose, the sugar found in milk and dairy products. This enzyme normally stops being produced after infancy, however, in some populations (particularly Caucasians), the gene has evolved to produce lactase into adulthood.</p>	GG	<p>Lactose intolerant. You are the 'wild type' (no genetic variants) and most likely to be lactose intolerant in adulthood due to low levels of lactase. Consuming milk and other dairy products may cause you uncomfortable side effects such as gas, bloating and diarrhoea. If you do experience such symptoms, avoid lactose-containing products completely or as much as possible (pg. 6 NLG).</p>

Pillar 2: Metabolism

Always craving that next piece of cake or bowl of pasta?

Fluctuating blood sugar plays havoc on your metabolism. It also disrupts hormones and causes us to store fat, put on weight and suffer from low energy, food cravings, poor concentration and irregular moods while increasing risk of obesity and developing type 2 diabetes (T2D).

High carbohydrate (sugar) diets derail blood sugar creating a 'rollercoaster': short bursts of energy followed by a crash. Insulin is a hormone that encourages cells to absorb sugar (glucose) from the blood to use as energy. Insulin also assists in breaking down fats and proteins for energy. High blood sugar means less fat metabolism, whereas, low blood sugar causes the body to release cortisol and adrenaline in response to the need to eat - you don't want either of these! Poor sleep has been linked with blood sugar imbalance, low levels of the 'satiety' hormone **leptin** and high levels of the 'hunger' hormone **ghrelin** - making you crave sugary snacks and repeating the cycle all over again!

See page 9 of your NLG for tips on balancing blood sugar.



*The tendency to reach for extra helpings and be more likely to gain weight, is governed by 3 key genes: **TCF7L2, LEPR & FTO**. They are instrumental in determining when you feel hungry, your likelihood of overeating and your propensity for weight gain. Check page 9 below to see if any of these variants may be disrupting your metabolism!*

Your metabolism genotype and advice:

GENE DESCRIPTION	YOUR RESULT	IMPACT & ADVICE
<p>TCF7L2 - Insulin Secretion</p> <p>Regulates blood sugar by influencing the production of insulin, a hormone responsible for promoting the absorption of glucose (sugar) from the blood into our cells where it is needed for energy. Genetic variants on TCF7L2 may cause decreased insulin secretion leading to risk of glucose intolerance and of developing type 2 and gestational diabetes in females.</p>	TC	<p>You are among the 20% of the population associated (genetically) with decreased insulin secretion and increased risk of developing T2D. To reduce your risk aim to get between 7-9 hrs of sleep per night (pg. 20 NLG), engage in regular physical activity and swap simple for complex carbohydrates (pg. 8 NLG) which will help balance blood sugar levels (pg. 9 NLG).</p>
<p>LEPR - Leptin Receptor</p> <p>Regulates the body's receptivity to the 'satiety' hormone, leptin, which is produced mainly by our fat cells and is responsible for controlling appetite by signalling to the body that it feels full after eating, and is also involved fat metabolism. Leptin works in opposition to the 'hunger hormone' - ghrelin. Variants are associated with lower levels of leptin leading to increased hunger, likelihood of overeating and obesity.</p>	GG	<p>You are one of over 40% of the population prone to (genetically) decreased leptin receptivity. This results in a delay of "feeling full" when eating, increased appetite, likelihood of overeating and possible risk of obesity. Poor sleep will affect your leptin levels further since sleep deprived individuals have been found to have low leptin and high ghrelin levels - making you feel more hungry! Aim to get 7-9hrs sleep each night (pg. 20 NLG), control portion size, calorie intake and eat meals more slowly to encourage leptin production.</p>
<p>FTO - Obesity and Type 2 diabetes</p> <p>Commonly called the "fat gene" due to its connection with appetite regulation, metabolic rate and increased calorie intake. FTO is present in high levels in the brain and other areas affecting metabolism such as the heart, kidneys and fat cells. Variants increase likelihood of overeating, enjoying larger food portions, having a preference for higher calorie foods and snacking more frequently due to low satiety and resulting in risk of increased body mass, obesity and type 2 diabetes.</p>	TT	<p>You are the 'wild type' not associated with increased waist circumference, obesity and T2D. Unfortunately, diet and lifestyle choices such as low physical activity and high intake of simple carbohydrates and/or fats can increase risk regardless of your genes. We recommend eating protein with every meal to help maintain fullness, swap simple for complex carbohydrates (pg. 8 NLG), control portions and engage in regular physical activity.</p>

Pillar 3: Stress

Are you more worrier or warrior?

We have all been negatively affected by a stressful day, event or situation, however, long term, chronic stress has an immense impact on our health and wellbeing and is one of the main contributing factors to many conditions and diseases.

Cortisol, one of the the body's main stress hormones, is produced naturally in moderate amounts to promote healthy daytime wakefulness and in larger amounts in response to stress (physical and emotional). Chronic stress leads to abnormally high cortisol levels which can affect immune function, reduce bone and muscle growth, fertility, sleep, increase insulin resistance and blood pressure, and makes us more sensitive to **adrenaline**, another stress hormone.

Unfortunately, eliminating stress completely is almost impossible but there are many techniques we can employ to improve our management of and resilience to stress in order to decrease the negative effects that long-term stress can have on our mental and physical health.

See page 10 of your NLG for stress management techniques.



*Your capacity to cope with stress is influenced by your lifestyle, genes and early life factors. Key genes involved in modulating your response to stress by controlling cortisol levels, blood pressure, the break down of stress hormones are: **FKBP5**, **ACE** and **COMT**. Check page 11 to see if any of these variants may be impacting your ability to cope with stress and what to do about it.*

Your stress genotype and advice:

GENE DESCRIPTION	YOUR RESULT	IMPACT & ADVICE
<p>COMT - Stress and pain resilience</p> <p>Responsible for breaking down and inactivating many compounds including dopamine and adrenalin. Adrenalin is responsible for increasing our heart rate and blood pressure in response to stress. Variants in COMT lead to slower breakdown of compounds causing a prolonged stress response, irritability, anxiety, heightened pain sensitivity and mood disorders.</p>	AG	<p>'Worrier type' (decreased genetic stress resilience). Slower breakdown of neurotransmitters and more susceptible to irritability, anxiety, pain, mood disorders and disturbed sleep. See pg. 10 of your NLG for tips on effective stress management. Check pg.18 of this report to see whether you should avoid caffeine in order to reduce anxiety, achieve better sleep and improve stress resilience.</p>
<p>FKBP5 - Cortisol regulation</p> <p>An important stress-regulating gene responsible for modulating cortisol levels by signalling for the lowering of cortisol after a stress response. Variants in FKBP5 are associated with prolonged and increased stress response due to impaired lowering of cortisol levels after a stressful event. Carriers of the variant are more susceptible to stress-related disorders such as depression, anxiety and post traumatic stress disorder (PTSD) in adulthood particularly as a result of childhood trauma.</p>	TC	<p>You are among the 30-40% of the population likely to take time to recover from stress, due to impaired cortisol regulation. Physical activity and balanced blood sugar (pg. 9 NLG) have been shown to improve resilience. See page 10 of your NLG for stress management tips. Check pg. 18 below to see if you should avoid caffeine to reduce anxiety.</p>
<p>ACE - Blood pressure and electrolyte balance</p> <p>Found mainly in the blood vessels and lungs and plays one of the most important roles in regulating blood pressure and the balance of fluids and salts (electrolytes) in the body. ACE causes the blood vessels to constrict and blood volume to increase leading to high blood pressure (HBP). Variants in ACE are associated with increased risk of high blood pressure which, in combination with prolonged stress, can be detrimental to heart health.</p>	GG	<p>You are likely to have elevated levels of ACE which plays a role in regulating blood pressure. As a result you have a risk of poor blood pressure regulation, potential for migraines and lower resilience during and after a stressful situation or intense exercise. Avoid exercise training at maximum heart rate and practice stress management techniques (pg. 10 NLG). Being overweight and/or a diet high in salt and saturated fats have been shown to increase likelihood of elevated blood pressure. Monitor blood pressure regularly.</p>

Pillar 4: Immunity

Let's get ready to rumble!

Our incredible immune system constantly protects us from infection and harm, however, it can sometimes become overwhelmed - overreacting to perceived threats, or not responding effectively enough to get us swiftly back to optimal health. The key is balance.

Inflammation is an integral part of the healing process and protecting a damaged area, however, if inflammation lasts too long it becomes 'chronic' and is linked with a range of health issues such as heart disease, arthritis, asthma, diabetes and even depression.

Histamine is a naturally occurring compound in certain foods and is also generated internally by our bodies since it fulfils some key functions: helps protect against infection and inflammation, is vital for the release of stomach acid and acts as an excitatory neurotransmitter in the brain causing alertness and cognition. However, too much histamine in our bodies can result in unpleasant allergy-type symptoms, anxiety and insomnia due to its neurotransmitter activity.

See page 11 of your NLG for information on anti-inflammatory foods and page 12 for more information on histamine.



*Your genes affect your immune system function. High levels of **TNF-alpha** can result in chronic systemic inflammation. Low **DAO** and **HNMT** may result in high histamine levels causing allergy symptoms (itchiness, hives, runny/ blocked nose, asthma or chronic coughing), insomnia and anxiety. Check page 13 below to see if any of these may be impacting your immunity.*

Your immunity genotype and advice:

GENE DESCRIPTION	YOUR RESULT	IMPACT & ADVICE
<p>TNFA - alpha - Inflammation</p> <p>Helps regulate the immune reaction involved in inflammation, fever and inhibiting tumour growth but is also involved in lipid metabolism, coagulation and insulin resistance as well as being implicated in a number of autoimmune diseases. Variants in TNF-alpha are associated with overactive immune responses and susceptibility to a range of inflammatory health conditions.</p>	GG	<p>You are likely to have a healthy inflammatory response and increased resistance to tumours. Diet and lifestyle factors such as alcohol, caffeine and sugary foods, lack of sleep, smoking and being overweight can lead to chronic inflammation regardless of your genes. Chronic inflammation has been linked to a number of conditions from joint pain to insulin resistance and even some types of cancer. Inflammation can be reduced naturally by avoiding the above triggers and following a diet rich in anti-inflammatory foods (pg. 11 NLG).</p>
<p>HNMT - Histamine</p> <p>Controls histamine levels in the brain and airways. The stimulatory activity of histamine in the brain may benefit memory and concentration, however, it can also negatively effect sleep and cause allergy-type symptoms. Genetic variants cause up to five-fold decrease in HNMT activity resulting in symptoms such as headaches, watery, itchy eyes and nose, coughing, wheezing, shortness of breath, insomnia and anxiety.</p>	CC	<p>You are likely to have healthy breakdown of histamine in the brain and lungs due to normal functioning of the HNMT pathway. HNMT activity can be affected by other genetic variants, particularly those impacting methylation such as MTHFR (check pg. 15 below), and by your diet and lifestyle. If you experience symptoms of histamine intolerance, try avoiding histamine-containing foods (pg. 12 NLG), alcohol, and support your methylation pathways (pg. 13 NLG).</p>
<p>DAO - Ingested histamine</p> <p>The DAO gene produces the main enzyme responsible for breaking down ingested histamine and needs vitamin B2 as a cofactor. Variants on this gene may decrease enzyme activity resulting in excess histamine and causing allergy-type symptoms including irritation to the GI tract, food allergies, gluten-sensitivity, Crohn's disease and ulcerative colitis, skin irritation, eczema and hives and even anxiety and insomnia. Those with histamine sensitivities will experience symptoms after ingesting even small amounts of histamine.</p>	TC	<p>You are among the 30-50% of the population likely to have genetically reduced DAO activity, and therefore increased risk of histamine sensitivity. If you experience symptoms you should reduce consumption of histamine foods (pg. 12 NLG), alcohol and black tea. Support DAO activity with vitamins B2, B6 and C.</p>



Pillar 5: Nutrients

Nutrients are the body's fuel.

Your body requires adequate amounts of **vitamins and minerals (micronutrients)** as well as **protein, fats and carbohydrates (macronutrients)** in order to function and regenerate properly.

Inadequate or excessive amounts of these vital nutrients can lead to various imbalances and multiple health concerns including low energy, obesity, type 2 diabetes, cardiovascular disease, anaemia, osteoporosis, depression, infertility, poor detoxification and cancer. By eating a diet rich in good quality protein and fats, complex carbohydrates and including a wide variety of vegetables and a smaller amount of fruit, you are helping ensure that your body gets the nutrients it needs to function optimally. Very few foods naturally contain vitamin D so it is important that you also get adequate exposure to sunlight and/ or take a good quality supplement.

Nutrient levels in the body are affected by diet, stress, exercise, age, your environment as well as genetic factors. See pages 8, 13, 14, 15 & 16 of your NLG for more information on nutrients.



*The need for and ability to utilise particular nutrients varies from person to person and is greatly influenced by genes. **MTHFR**, **FUT2** and **VDR** may affect your levels of vitamins B9 (folate), B12 and D respectively. **FTO**, **TCF7L2** and **NOS3** play a role in determining your ideal macronutrient intake. Check pages 15 & 16 below to see whether you have any of these influential variants and, if so, what to do about it.*

Your nutrients genotype and advice:

GENE DESCRIPTION	YOUR RESULT	IMPACT & ADVICE
<p>MTHFR - Vitamin B9 (folate)/ Methylation</p> <p>Responsible for converting folate into the active form needed by the body to support DNA synthesis and repair, cell division, healthy pregnancy as well as the synthesis of the neurotransmitters dopamine and serotonin. Variants have been linked to cardiovascular disease, infertility, neural tube defects, low energy and mood, poor detoxification and impaired gene expression.</p>	AG	<p>"Medium methylator" - you are likely to have a reduced ability to convert folate to 'active' folate (vitamin B9). A diet low in B vitamins and other vital co-factors such as zinc, magnesium, betaine and choline; and high alcohol consumption will reduce methylation further. See pg. 13 of your NLG for more information on methylation.</p>
<p>FUT2 - Vitamin B12</p> <p>Absorption of vitamin B12 requires the secretion of intrinsic factor (IF) from the gastric cells. FUT2 'Secretors' are more susceptible to H. pylori infection which reduces IF secretion and increases risk of poor B12 absorption. Vitamin B12 is important for making red blood cells, nerves and DNA. Low B12 can lead to anaemia, fatigue, pale skin, feeling faint, heart palpitations, cardiovascular disease, swollen tongue, and nerve problems.</p>	AG	<p>Secretor (Non-East Asian populations). You are susceptible to reduced gastrointestinal absorption of vitamin B12 leading to low serum B12 levels. Alcohol, certain medication and following a vegan or vegetarian diet can increase your risk of low B12 levels regardless of genetics. If you suspect low vitamin B12, consider a blood test to check your levels. Regular vitamin B12 injections will help to avoid the digestive system.</p>
<p>VDR - Vitamin D</p> <p>Regulates the body's vitamin D3 receptor and mediates the production of dopamine, one of the body's 'feel good' chemicals. This is one of the reasons why lack of sunlight is associated with low mood. Vitamin D is also crucial for bone formation, immune regulation and cell growth and differentiation. Over 30% of the population carries the variant which may lead to low vitamin D levels and low dopamine production.</p>	CC	<p>You are likely to have healthy receptivity to vitamin D. Make sure to expose your skin to sunlight regularly (without tanning or burning) or, if that's not possible, take a good quality vitamin D supplement (pg. 14 NLG) - especially during winter months.</p>

Your nutrients genotype and advice:

GENE DESCRIPTION	YOUR RESULT	IMPACT & ADVICE
<p>FTO - Protein & fat consumption</p> <p>Commonly called the "fat gene" due to its connection with weight and body composition. FTO is present in high levels in the brain and other areas affecting metabolism such as the heart, kidneys and fat cells. Variants increase likelihood of obesity and type 2 diabetes. Current research shows that a diet higher in protein can substantially help with weight loss and maintenance in those with the FTO variant.</p>	TT	<p>You are likely to be able to maintain a consistent weight without having to closely watch what you eat. Eventually, however, diet and lifestyle choices such as low physical activity and high intake of simple carbohydrates and fatty foods can increase risk of obesity and type 2 diabetes regardless of genetic predisposition. We recommend good quality protein (20-30% of your daily energy) and healthy fats (pg. 15 NLG) along with regular physical activity to maintain overall health and longevity.</p>
<p>TCF7L2 - Carbohydrate & fat consumption</p> <p>Regulates blood sugar by influencing the production of insulin, a hormone responsible for promoting the absorption of glucose (sugar) from the blood into our cells where it is needed for energy. Genetic variants on TCF7L2 may cause decreased insulin secretion leading to risk of glucose intolerance and of developing type 2 and gestational diabetes in females.</p>	TC	<p>You are likely to be sensitive to refined, simple carbohydrates and saturated fats in terms of weight gain and decreased insulin secretion increasing risk of type 2 diabetes. You would benefit from eliminating simple carbohydrates (pg. 8 NLG) and unhealthy fats (pg. 15 NLG) from your diet to lose weight, and increasing whole grains to reduce your risk of developing type 2 diabetes.</p>
<p>NOS3 - Omega-3</p> <p>Produces the enzyme nitric oxide synthase responsible for making nitric oxide, known to be protective in our blood vessels and to be involved in vasodilation (opening of the blood vessels). Variants result in low nitric oxide production which has been associated with cardiovascular disease. Recent research has shown that Omega-3 fat has a positive impact on cardiovascular risk in people with NOS3 variants by lowering another kind of fat called triglycerides which is also linked to lower HDL (good) cholesterol.</p>	GG	<p>You are likely to have normal NOS activity and healthy ability to produce nitric oxide which is positively associated with cardiovascular health. As a result you do not have an increased need for omega-3 fats in your diet, however, you should ensure to consume an adequate amount of omega-3 (pg. 16 NLG) in order to keep your risk low and promote overall health.</p>



Pillar 6: Stimulants

Ready for the next hit, the next fix, the next high?

A lot of us wake up to the smell of coffee and wind down with a glass or two of wine in the evening. For some of us, these seemingly harmless habits can wreak havoc on our health.

Alcohol prevents you from getting a refreshing night's sleep, disrupts your metabolism and alters your brain chemistry - slowing you down and potentially leading to low mood, insomnia and anxiety.

Caffeine is a controversial area in nutrition with contradictory research. The ability to metabolise caffeine is highly individual depending on genetic variants. Even moderate amounts of caffeine may have an adverse effect if you are a slow caffeine metaboliser (find out below). A big concern about caffeine is how it triggers the release of stress hormones - **adrenalin** and **cortisol**. Cortisol causes spiked blood sugar (remember the blood sugar rollercoaster?) leading to increased fat storage around the midriff. Although caffeine increases brain activity and energy in the short term, over time, it can actually drain your body's ability to produce energy naturally.

See page 18 of your NLG for tips on how to kick caffeine if you feel you need to.



Your genes significantly impact your response to caffeine and alcohol. **CYP1A2** determines how effectively you break down (detoxify) caffeine while **ADORA2A** affects how your nervous system reacts to it - making you feel 'wired' for longer. The **ADH** genes control the rate at which you convert alcohol to acetaldehyde - a compound more toxic than alcohol which can severely damage the body! Check page 18 to see if any of these variants impact you.

Your stimulant genotype and advice:

GENE DESCRIPTION	YOUR RESULT	IMPACT & ADVICE
<p>CYP1A2 - Caffeine sensitivity</p> <p>Responsible for detoxifying multiple substances including pharmaceutical drugs (e.g. paracetamol), and most famously, caffeine. Variants are associated with increased activity and thus faster detoxification of substances. This is both good and bad depending on the substance being detoxified. With respect to caffeine, faster metabolism is generally considered positive since it reduces the time caffeine is active in body, reducing its effect.</p>	AA	<p>You are likely to metabolise caffeine quickly which means you should be able to tolerate caffeine without feeling anxious or increasing your risk of hypertension. You may also be able to consume caffeine later in the day without impacting your sleep. This genotype is also associated with better physical performance in response to caffeine.</p>
<p>ADORA2A - Adenosine impact</p> <p>Adenosine receptor activity increases throughout the day as the body generates adenosine, a by-product of energy (ATP) release. ADORA2A also regulates dopamine release - as adenosine levels increase, the stimulatory effect of dopamine declines - facilitating sleep. Caffeine blocks this interaction increasing the stimulatory effect of dopamine, causing alertness. Variants on ADORA2A increase the stimulatory impact of caffeine.</p>	TC	<p>You are likely to have lower ADORA2A activity and increased sensitivity to caffeine-related sleep disturbance, particularly if you are a slow metaboliser (check your CYP1A2 status above). Consuming caffeine in the evening may affect your ability to fall asleep or achieve restful sleep. If you suffer from insomnia, we recommend that you limit consumption of caffeinated food and drinks including coffee, tea, carbonated drinks (especially 'energy drinks'), and chocolate (pg. 18 NLG). Regular consumption of caffeine may, however, result in improved tolerance.</p>
<p>ADH1B - Alcohol sensitivity/ detoxification</p> <p>Responsible for breaking down alcohol. Variants on this gene (which are more common in Asian populations than Caucasians), can result in as much as 100x faster metabolism of alcohol to more toxic acetaldehyde causing more severe symptoms of toxicity such as facial flushing, nausea and headaches, and increased oxidative damage to the body when consuming alcohol.</p>	CC	<p>You are likely to convert alcohol to acetaldehyde relatively slowly. This is considered positive since acetaldehyde is more toxic than alcohol and can cause unpleasant symptoms and oxidative (free radical) damage to the body. Alcohol metabolism is a multi-step process affected by other genes, including those involved in 'phase II' detoxification. To support the detoxification of acetaldehyde from the body increase magnesium, molybdenum, zinc and vitamins B2 and B3 which are all important co-factors. Candida overgrowth (pg. 7 NLG) will increase your levels of acetaldehyde.</p>



Pillar 7: Exercise

On your mark, get set, **GO!**

Whether those words make you feel energised or exhausted, exercise is an important part of maintaining health. Regular exercise helps control weight, combats many health conditions including type 2 diabetes, stroke, metabolic syndrome and arthritis; improves mood, sleep and sex drive and boosts energy. Exercise can also be a fun way to socialise and spend time outdoors breathing in fresh air. Find something that works for you - take a dance class, hit hiking trails, take up tennis, join a team, stretch and unwind in a yoga or pilates class. Whatever gets you out there and gets you moving, sweating and breathing!

Aim for at least 2.5 hrs per week of moderate intensity exercise such as walking or body weight exercises, and 2 hours of vigorous exercise such as running or swimming.

Find out which type of training best suits your genotype (next page) and how prone you are to injury on the next page.

See page 19 of your NLG for tips on injury prevention & exercise recovery.



*Your genes can influence the type of exercise your body is naturally more suited to. **ACE** impacts your aerobic efficiency, VO₂max and slow twitch muscle fibre volume making you better suited to either endurance or power exercise. **COL1A1 & GSTM1** influence your tendency for injury and speed of recovery after exercise. Check page 21 below to see what your specific variants say about you.*

Your exercise genotype and advice:

GENE DESCRIPTION	YOUR RESULT	IMPACT & ADVICE
<p>ACE - Power vs endurance & VO2max</p> <p>Controls blood pressure and fluid (water/sodium) balance in the blood. This is the most researched gene in relation to sporting performance and its role in vasoconstriction and blood pressure control.</p>	AG	<p>You are likely to have good aerobic efficiency and VO2max. A mixture of power and endurance based training would be best suited for you. Monitor your blood pressure and avoid exercise training at maximum heart rate. Being overweight and/or a diet high in salt will increase your blood pressure and should be avoided.</p>
<p>COL1A1 - Injury</p> <p>Associated with Type 1 collagen, the main collagen found in connective tissues and in abundant in bone, cornea, skin, tendons, ligaments and cartilage. Variants are associated with increased risk of osteoporosis, and tendon and ligament injuries in sport.</p>	CC	<p>You are likely to be genetically prone to tendon and ligament injuries particularly ACL rupture, Achilles tendon injury, shoulder dislocation and 'tennis elbow', due to lower type 1 collagen production. Pre-habilitative measures relevant to your sport such as stretching, hamstring and calf strengthening would be beneficial. Training on softer surfaces may help to prevent injury. Consider nutritional support for connective tissue such vitamin C which supports collagen production. See our tips on injury prevention and recovery on pg. 19 of your NLG.</p>
<p>GSTM1 - Recovery</p> <p>An important detoxification enzyme which helps to neutralise free radicals in the body via glutathione, a powerful antioxidant. GSTM1 processes carcinogens, therapeutic drugs, environmental toxins and other free radicals including those generated during exercise. This gene is known to be highly polymorphic meaning variants are common. Over 50% of Caucasians have only one or no copies of the gene. This can lead to increased tiredness and decreased recovery from exercise.</p>	AA	<p>GSTM1 gene likely absent. This means you are likely to have reduced ability to neutralise free radicals in the body and therefore experience slower recovery after exercise. Excessive exercise, dietary and environmental toxins, chronic stress, inflammation and low glutathione levels will burden GSTM1 further, increasing your risk of oxidative damage. We recommend stress management (pg. 10 NLG), reducing inflammation (pg. 11 NLG) and increasing antioxidants (pg.17 NLG) to support this important detoxification pathway.</p>



Pillar 8: Sleep

Night owl or a morning lark?

Sleep is another fundamental factor in maintaining overall health and wellbeing and is often undervalued or even frowned upon in our fast-paced age where working long hours or being out with clients, colleagues or friends until all hours is becoming the norm.

Studies show that less than six hours of sleep per night weakens your body and increases risk of obesity, diabetes, cardiovascular disease and stroke - not to mention the effect on your mood and mental capacity! Lack of sleep also increases our likelihood of reaching for stimulants such as caffeine, sugary foods and energy drinks to keep us going during the day which negatively impact health, mood and weight and can result in feeling 'wired' in the evening and needing to resort to alcohol or sleeping pills to fall asleep.

Our internal body clocks are regulated by **24 hour cycles (circadian rhythms)** which respond primarily to light or darkness in the environment. Darkness signals the body to drop in temperature and to release the 'sleep hormone' - **melatonin**. Exposure to light stimulates a raise in body temperature and the release of the stimulating hormone - **cortisol**, which promotes wakefulness.

See page 20 of your NLG for some pro sleep tips.



*Your body clock is regulated by a group of 'clock genes' including **CLOCK**, **PER** and **MTNR** which play a major role in orchestrating your body's circadian rhythms. Improper signalling due to environmental or genetic variation can cause disrupted or altered sleep patterns. Check page 22 to see if any of these variants may be disrupting your sleep.*

Your sleep genotype and advice:

GENE DESCRIPTION	YOUR RESULT	IMPACT & ADVICE
<p>CLOCK - Early bird / night owl</p> <p>The CLOCK gene plays a central role in regulating circadian rhythms in the body. Many natural processes in the body are under the control of circadian rhythms, most notably sleeping and waking. Variants in the CLOCK gene are associated with altered sleep length affecting daytime alertness and susceptibility to mood disorders. Less sleep also increases appetite and susceptibility to type 2 diabetes. The CLOCK gene determines whether you are an 'early bird' or 'night owl'.</p>	GG	"Night Owl". You are highly likely to experience shorter sleep duration, prefer evening activity and to rise later. This increases daytime tiredness and susceptibility to mood disorders as a result. In addition, raised ghrelin levels (due to less sleep) may cause increased appetite, a tendency to reach for sugary foods, increasing your risk of higher body mass and of type 2 diabetes. Aim to get between 7-9 hrs sleep each night and avoid bright light/ electronics and simple carbohydrate foods before bed (pg. 20 NLG).
<p>PER3 - Circadian rhythms</p> <p>The PER family of genes work in opposition to CLOCK to regulate the timing of sleep onset by signalling appropriate circadian functions to begin in response to environmental triggers - such as the release of melatonin and lowering of body temperature in response to dim light/ onset of darkness. PER3 has been associated with differences in sleepwake preference, sensitivity to light triggers and sleep quality.</p>	GC	Your response to environmental triggers that regulate the sleep / wake cycle likely to be reduced and therefore you may be more prone to sleep disruptions. Diet and lifestyle factors such as caffeine, stress, alcohol and bright light, can also play a part in disrupting your body clock regardless of your genotype. Maintaining a regular sleep routine is particularly important for you (pg. 20 NLG). Avoid stimulants and bright light before bed to ensure restful, restorative sleep.
<p>MTNR1B - Melatonin receptivity</p> <p>Found mainly in the eyes and brain and involved in the body's receptivity to melatonin, the 'sleep hormone' released in response to the onset of darkness. Melatonin is involved in several processes in the body including circadian rhythms, mood regulation, anxiety, sleep appetite, immune responses and heart function. Variants are associated with disturbed sleep and increased risk of impaired blood glucose metabolism leading to type 2 diabetes.</p>	CG	You are more likely to experience disturbed sleep patterns, particularly early waking, increasing your risk of impaired blood sugar metabolism and type 2 diabetes. Your risk increases with low exercise and a diet high in simple carbohydrates (sugar). Aim to get between 7-9 hrs sleep per night (pg. 20 NLG), increase your physical activity, decrease/avoid intake of simple carbohydrates (pg. 8 NLG) and bright light/ electronics (particularly before bed), and increase tryptophan-rich foods (pg. 4 NLG) to encourage healthy melatonin production and activity.