dnacore

Welcome

Sample Report

to your personalised nutrition and fitness report

Date of birth: 01 Jan 2001	Date reported: 17 Jul 2023	Sample number: 12345678
Referring practitioner: Private		

DNA Core is designed to guide you on your journey to live a healthier and more active life, and help you reach your weight management and health goals.

DNALYSIS
Biotechnology

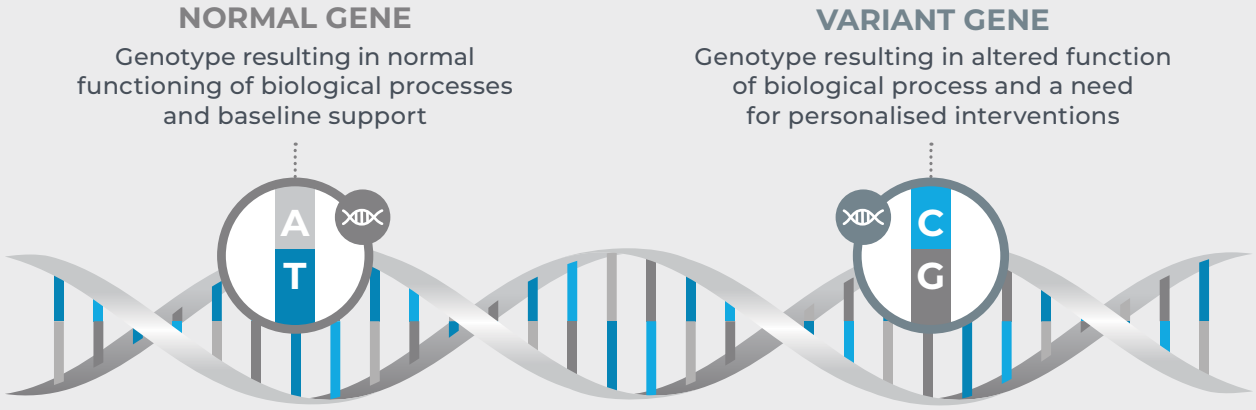
Contents

The science behind DNA Core

Genetics and personalised medicine

Genes are segments of DNA that contain the instructions your body needs to make each of the many thousands of proteins required for life. Each gene is comprised of thousands of combinations of "letters" (called bases) which make up your genetic code. The code gives the instructions to make the proteins required for proper development and function.

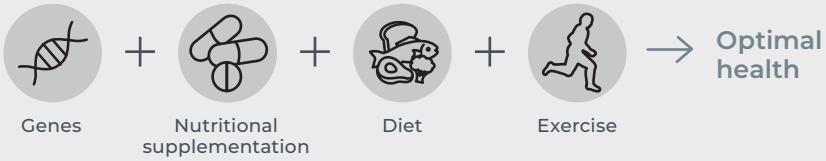
Genetic variations can affect the expression of a gene, thereby affecting metabolic processes that are important for maintaining a state of health. Knowledge of these variations offers a powerful advantage, enabling personalised nutritional, lifestyle, and exercise recommendations aimed at optimising health, weight management and performance.



How does understanding my DNA help me on my journey to achieve my core health goals?

Our cells are complex machines that perform critical, biological processes. These processes, or pathways, have specific requirements to function. Knowledge of the genetic variations you carry can help to determine which diet, lifestyle interventions and nutrients you may need to optimise your health.

The personalised recommendations in this report are grounded in reliable, valid, scientific evidence, that when used in conjunction with a healthy diet, exercise and lifestyle plan, will help you make informed decisions regarding your healthcare journey.

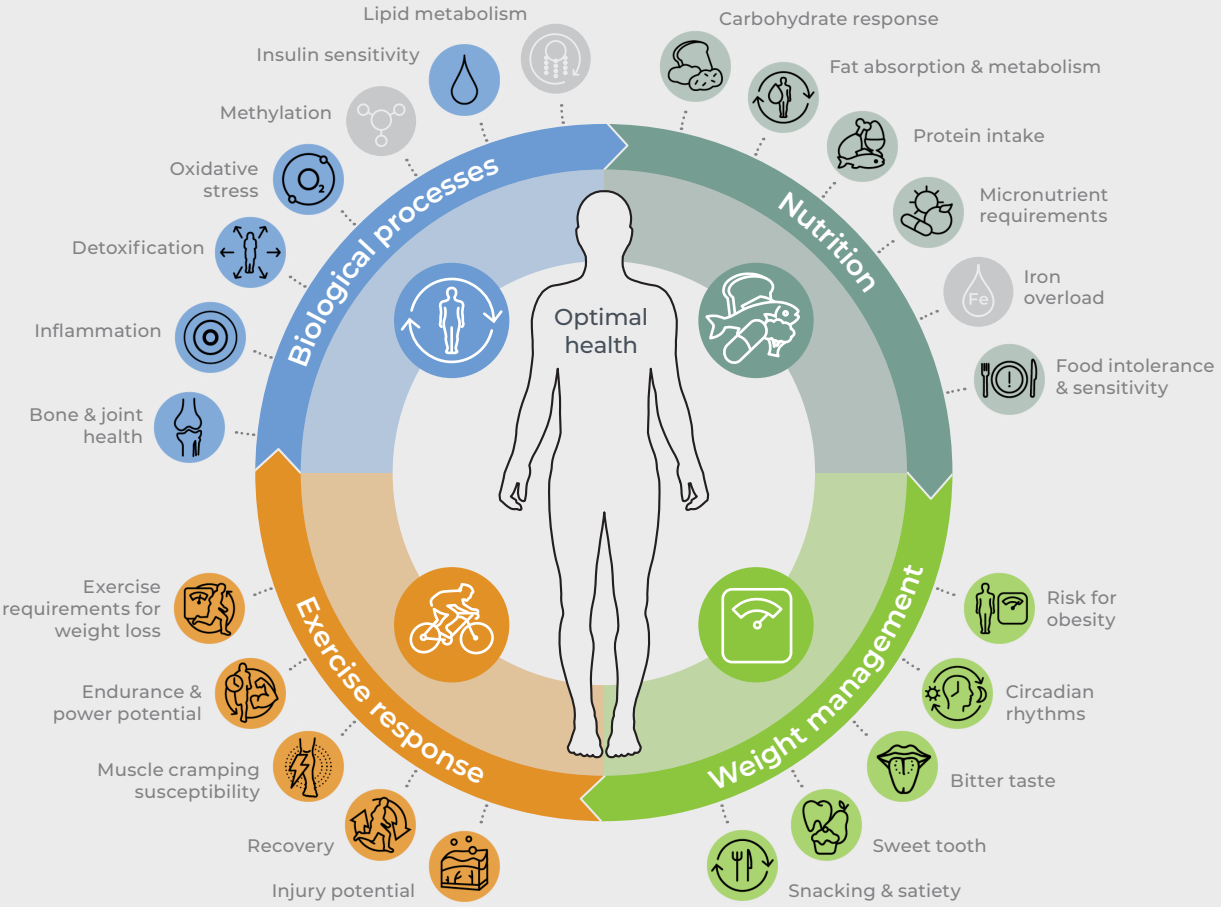


Scan to watch "Introduction to genetics" for more information on the above.

An overview of DNA Core

DNA Core is your handy reference guide to weight management, exercise responsiveness, nutrient requirements, and a host of other factors that combine to help you reach your health goals. Your genes never change, so you can refer to this report at any time.

DNA CORE REPORTS ON FOUR KEY AREAS:



How to read your report

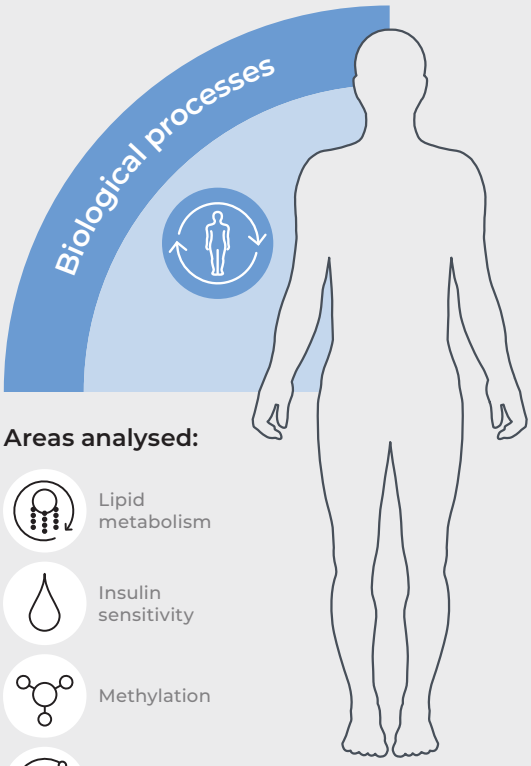
We have analysed your DNA and identified specific genetic variations that make you who you are. These variations are not “good” or “bad” but rather give insights into how you can better support gene expression for optimal cellular functioning. Based on your specific genetic variations, you might need interventions in one or more of the key biological areas to enhance your overall health.

The report is structured and colour-coded based on the core areas shown above. The biological processes that have been identified as priority areas i.e. requiring additional support, are highlighted on the summary pages that folllow. This is followed by a summary page of practical recommendations to support your core priority areas. You will then be able to view genotype results in the technical section of the report, followed by detailed information and recommendations for each of your priority areas. In the appendix, you will find fact sheets for your recommended diet type for weight management and exercise recommendation tools.

Summary of core areas

Your biological processes summary

The biological processes that have been identified as priority areas which require additional support, are highlighted in blue below. The greyed-out results indicate a normal or typical outcome.



Areas analysed:

- Lipid metabolism
- Insulin sensitivity
- Methylation
- Oxidative stress
- Detoxification
- Inflammation
- Bone and joint health

Your lipid metabolism results:

Typical risk for high triglycerides
Lower triglyceride benefits heart health
(triglycerides = energy stored as fats in the blood)

Typical risk for dyslipidaemia
Regular metabolism of "good" & "bad" cholesterol

Typical risk for lipid oxidation
Functioning antioxidant enzyme to protect your blood vessels

Your insulin sensitivity results:

Elevated risk for type 2 diabetes
Poor insulin response to food intake, raising blood glucose levels

Your methylation results:

Typical risk for raised homocysteine levels
Homocysteine levels within range is important for heart & mental health, mood, ageing & reproduction

Your oxidative stress results:

Suboptimal function of antioxidant enzymes
High risk of oxidative stress, cell damage & premature ageing

Your detoxification results:

Typical function of phase I detoxification enzymes
Regulated response to environmental pollutants with low risk of cell damage

Reduced function of phase II detoxification enzymes
Poor ability to clear toxins & metabolites from the body with high risk of cell damage

Your inflammation results:

Elevated risk for chronic inflammation
Negatively impacts heart & mental health, weight management, & recovery

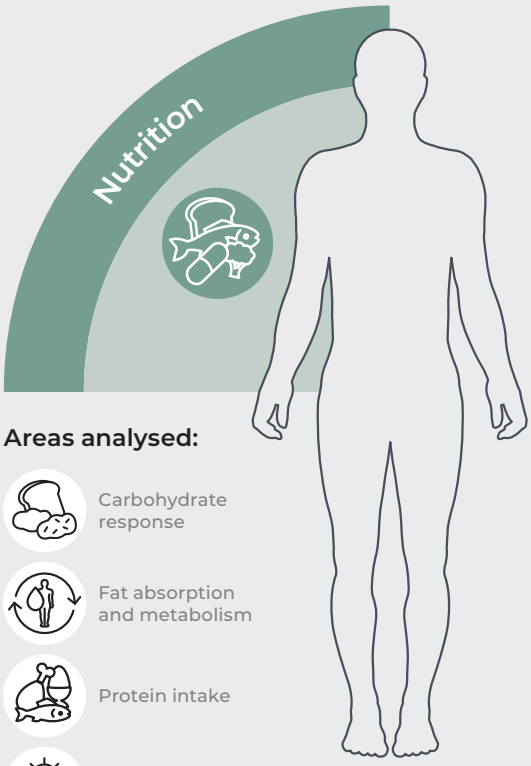
Your bone and joint health results:

Elevated risk for low bone mineral density
Poor bone health increases risk for osteoporosis & fractures

Summary of core areas

Your nutrition summary: Nutrient requirements

The areas that have been identified as priority areas which require additional support, are highlighted in green below. The greyed-out results indicate a normal or typical outcome.



Areas analysed:

- Carbohydrate response
- Fat absorption and metabolism
- Protein intake
- Micronutrient requirements
- Iron overload

Your macronutrient requirements:

Moderate-to-high barrier to weight loss with carbohydrate intake. You may experience weight loss-resistance when eating a carbohydrate-rich diet

Moderate barrier to weight loss with higher saturated fat intake
You may experience weight loss-resistance when eating too many high saturated fat foods

Typical benefit for weight management when eating standard recommendations of mono-unsaturated fats

Enhanced benefit for weight management when eating more polyunsaturated fats

Enhanced benefit for weight management when eating more good-quality protein foods

Your micronutrient requirements:

Vitamin A: Typical
Able to activate vitamin A from food source

Vitamin B2: Typical
Efficient utilisation of the essential vitamin

Vitamin B6: Increased
Susceptible to insufficiency: negatively impacts heart & mental health, immunity & energy metabolism

Folate: Increased
Susceptible to insufficiency: negatively impacts heart, mental health & DNA health, with fatigue

Vitamin B12: Increased
Susceptible to insufficiency: anaemia, fatigue, poor heart health & cognitive function

Choline: Typical
Efficient utilisation of the essential nutrient

Vitamin C: Increased
Susceptible to insufficiency: Important for immunity, skin & joint health & wound healing

Vitamin D: Increased
Susceptible to insufficiency: essential in growth & development, immunity, mental health & skeletal health

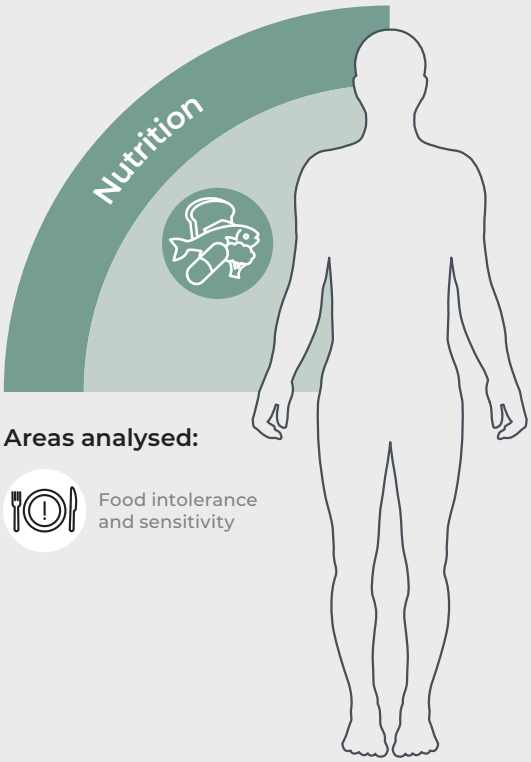
Calcium: Increased
Susceptible to insufficiency: essential in growth & development & skeletal health

You are at not risk of iron overload
Normal regulation of iron turnover in the body

Summary of core areas

Your nutrition summary: Food intolerance and sensitivity

The areas that have been identified as priority areas which require additional support, are highlighted in green below. The greyed-out results indicate a normal or typical outcome.



Areas analysed:

Food intolerance and sensitivity

Lactose intolerance:

You can tolerate lactose
You should be able to digest lactose - the sugar in milk

Your risk for coelliac disease (gluten intolerance):

You are at increased risk for coeliac disease
You may experience adverse symptoms with gluten intake

Your alcohol metabolism:

Typical alcohol metabolism
No significant increased risk of liver disease with moderate alcohol consumption

Your food sensitivities:

You are caffeine sensitive
Caffeine may negatively affect your sleep, anxiety, heart & bone health

You are salt sensitive
Eating salt & salty foods will increase blood pressure

Summary of core areas

Your weight management summary

The areas that have been identified as priority areas which require additional support, are highlighted in green below. The greyed-out results indicate a normal or typical outcome.

Areas analysed:

- Risk for obesity
- Circadian rhythms
- Bitter taste
- Sweet tooth
- Snacking & satiety

Your weight and body composition:

Moderate risk for obesity & weight loss resistance
You may not lose weight as quickly as others

Circadian rhythm influence on your weight and exercise performance:

You are more likely to be a morning person
You may prefer waking up early, getting to bed early & require less effort when exercising earlier in the day

Your eating behaviours:

Increased taste sensitivity to bitter foods
You may have an aversion to vegetables with a bitter taste

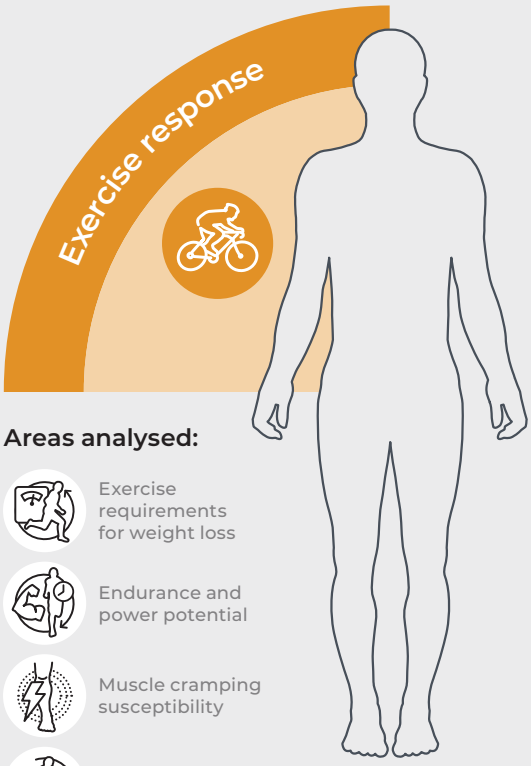
Enhanced "sweet tooth"
You are more likely to crave high quantities of sweet foods

Elevated snacking & satiety behaviour
You may feel less satisfied after meals & be more likely to snack often

Summary of core areas

Your exercise response summary

The areas that have been identified as priority areas which require additional support, are highlighted in green below. The greyed-out results indicate a normal or typical outcome.



Areas analysed:

- Exercise requirements for weight loss
- Endurance and power potential
- Muscle cramping susceptibility
- Recovery
- Injury potential

Your exercise requirements for weight loss:

You require a MODERATE MET HOURS exercise plan
to mobilise fat stores & manage weight in response to exercise

Your endurance and power potential:

Mixed athletic potential
A higher genetic potential for mixed endurance & power-based exercise

Your muscle cramping susceptibility:

Elevated cramping susceptibility
You are more likely to suffer from muscle cramps

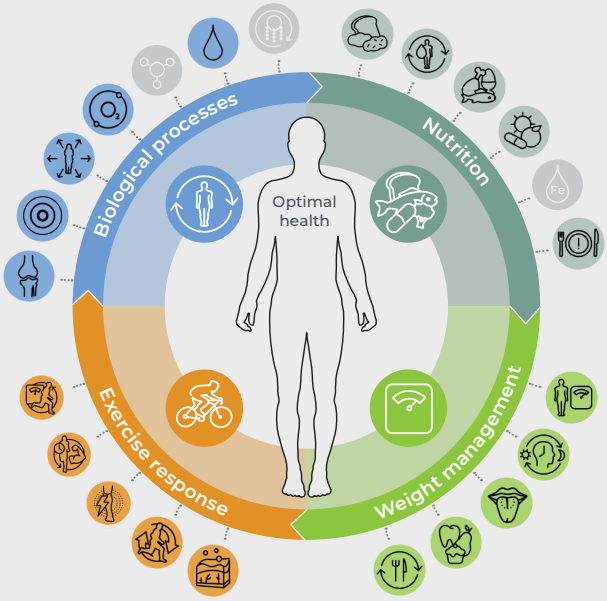
Your recovery from exercise:

Slow recovery
You recover slower from strenuous exercise

Your risk for soft tissue injuries:

Elevated injury risk
Poor ability to rebuild collagen with strenuous activity

Summary of recommendations



Biological processes

Support insulin sensitivity:
- Nutrients: Good quality fats, fibre, protein
- Focus foods: High-fibre, nutrient-dense wholefoods, limiting carbohydrate-rich foods
- Maintain a healthy weight, regular meal-timing with portion control
- Exercise regularly & manage stress

Support antioxidant status:
- Nutrients: Vitamins C & E, selenium, zinc, copper, resveratrol, quercetin
- Focus foods: Colourful fruits (citrus, apples, berries), nuts, seeds, leafy greens, lean meat
- Exercise at moderate intensity, daily
- Manage stress & limit toxin exposure (pollutants, chemicals etc.)

Support detoxification:
- Nutrients: Sulforaphane, N-Acetylcysteine (NAC), milk thistle
- Focus foods: Cruciferous vegetables (broccoli, cabbage, kale), beets, carrots, artichokes, garlic, onions
- Minimise toxin exposure (smoking, alcohol, personal care products), manage stress & support gut health

Support inflammation:
- Nutrients: Omega-3 fatty acids, anthocyanins, probiotics
- Focus foods: Fatty fish, blueberries, fermented foods, ginger
- Follow an anti-inflammatory diet, avoid alcohol & smoking
- Manage stress, support good gut health & get adequate sleep

Support bone health:
- Nutrients: Vitamin D & K, calcium, magnesium
- Focus foods: Dairy, fatty fish, nuts, leafy greens, tofu
- Do load bearing exercise
- Limit caffeine to less than 3 cups of coffee per day

Nutrition

Your recommended diet:
- Follow a low carbohydrate diet
- Limit carbohydrate intake to less than 40% of total energy (calories consumed)
- Decrease or limit saturated fat food sources such as fat on meat
- Increase intake of polyunsaturated fat food sources: walnuts, flax & fatty fish
- Increase protein intake (plant-based & lean) to make up 25% of total calorie consumption

Micronutrient requirements:
- Avoid insufficiency with nutrient-rich foods & supplementation

Vitamin A	Folate	Vitamin C
Vitamin B2	Vitamin B12	Vitamin D
Vitamin B6	Choline	Calcium-rich foods

Food intolerances and sensitivities:
- Check for gluten intolerance & eliminate gluten
- Limit caffeine to 1 cup coffee/day in the morning
- Avoid salt & salty foods

Weight management

Set realistic goals for weight management:
- Follow a gene-based diet plan

Circadian rhythm influence:
- Exercise in the morning for best results

Challenge your bitter taste sensitivity:
- Add herbs & spices to young vegetables

Control your sweet tooth:
- Avoid all high-sugar & artificially sweetened foods

Incorporate mindful eating practices:
- Don't skip meals, choose healthy snacks & monitor portion-size

Exercise response

Exercise for weight management:
- Follow an exercise program that reaches at least 24 MET hours per week

A mixed training program will improve performance:
- Moderate-long duration, endurance exercise plus short duration interval/sprint/strength training

Decrease muscle cramping susceptibility:
- Ensure adequate hydration with electrolytes, warm-up properly, pace yourself

Optimise recovery:
- Ensure sufficient rest between intensive sessions with good sleep hygiene

Manage your risk of soft tissue injuries:
- Practice 'prehabilitative' & flexibility training & support collagen health with nutrition

Genotype results table

○ No Impact ⊘ Beneficial Impact ◔ Low Impact ◔◔ Moderate Impact ◔◔◔ High Impact

INSIGHT	GENE NAME	GENE VARIATION	GENE RESULT	GENE IMPACT			
				Biological areas	Nutrition	Weight management	Exercise response
Lipid metabolism	APOC3	3175 C>G	CC	○			
	APOE	E2/E3/E4	E3/E3	○			
	CETP	279 G>A	AG	◔			
	LPL	1595 C>G	CC	○			
	PON1	A>G	GA	◔			
Insulin sensitivity	PPARG	Pro12Ala or C>G	CG	⊘	◔◔	◔◔	◔◔
	TCF7L2	C>T	TT	◔◔	◔◔◔	◔◔◔	
	SLC2A2	Thr110Ile	TC	◔	◔◔	◔◔	
	FTO	T>A	AA	◔◔	◔◔◔	◔◔◔	◔◔◔
	IRS1	T>C	TT	⊘			
		G>A	AG	◔			
Methylation	MTHFD1	1958 G>A	GG	○	○		
	MTHFR	677 C>T	CT	◔◔	◔◔		
		1298 A>C	AA	○	○		
	MTR	2576 A>G	AG	◔	◔		
	MTRR	66 A>G	AA	○	○		
	CBS	699 C>T	CC	○	○		
	COMT	472 G>A	GG	○	○		
Phase I detoxification	CYP1A1	Ile462Val A>G	AA	○			
		T>C	TT	○			
Phase I detoxification - caffeine	CYP1A2	A>C	CA		◔◔		
Phase II detoxification	GSTM1	Insertion/Deletion	Deletion	◔◔◔			
	GSTP1	313 A>G	AG	◔			
	GSTT1	Insertion/Deletion	Deletion	◔◔◔	◔◔◔		
	NQ01	609 C>T	CC	○			
Antioxidant enzymes	eNOS	894 G>T	GG	○			○
	MnSOD/ SOD2	47 T>C (Val16Ala)	CC	◔◔◔			◔◔◔
	GPx	Pro198Leu	CT	◔◔			
	CAT	-262 C>T	CC	⊘			

Genotype results table (continued)

○ No Impact ⊘ Beneficial Impact ○ Low Impact ○○ Moderate Impact ○○○ High Impact

INSIGHT	GENE NAME	GENE VARIATION	GENE RESULT	GENE IMPACT			
				Biological areas	Nutrition	Weight management	Exercise response
Inflammation	CRP	G>A	GG	○○			○○○
	IL-1A	4845 G>T	GG	○			
		-889 C>T	TC	○○			
	IL-1B	3954 C>T	CC	○			
		-511 A>G	AA	○			
	IL-1RN	2018 C>T	TT	○○			
	IL-6	-174 G>C	CC	○○○			○○○
	IL-6R	A>C	CC				○○○
	TNFA	-308 G>A	GG	○	○	○	○
Vitamin D metabolism & bone health	VDR	Fok1 T>C	TT	○○○	○○○		
		Bsm1 G>A	AA	○○○	○○○		
		Taq1 T>C	CC	○○○	○○○		Ⓟ*
	CYP2R1	A>G	AA		○		
	GC	T>G	GG		○○○		
		1296 G>T	TT		○○○		
Vitamin A metabolism	BCO1	G>T	GT		○○		
		Ala379Val (C>T)	CC		○		
Vitamin B12 transport	FUT2	Gly258Ser G>A	GG		○○○		
Lactose Intolerance	MCM6	–13910 C>T	TC		○		
Gluten intolerance	HLA	DQ2 / DQ8	DQ2.5 & DQ8		○○○		
Alcohol metabolism	ALDH2	rs671 G>A	GG		○		
Iron overload	HFE	C282Y & H63D	282CC & 63HH		○		
Fat absorption & metabolism	ADIPOQ	-11391 G>A	GG		○○	○○	
	APOA2	-256 T>C	CT		○	○	
	APOA5	-1131 T>C	TT		○○	○○	
	FABP2	Ala54Thr G>A	GG		○	○	
	PLIN	11482 G>A	GG		○	○	

*The Ⓟ (Power) and/or Ⓔ (Endurance) impact in the exercise response column refers to a moderate or high gene impact in the Endurance and/or Power Potential section indicating a genetic benefit to you. See page 52 for more information on your Endurance and Power Potential results.

Genotype results table (continued)

○ No Impact ⊘ Beneficial Impact ◯ Low Impact ◯◯ Moderate Impact ◯◯◯ High Impact

INSIGHT	GENE NAME	GENE VARIATION	GENE RESULT	GENE IMPACT			
				Biological areas	Nutrition	Weight management	Exercise response
Polyunsaturated fatty acid metabolism	FADS1	G>T	GT		◯◯		
Energy homeostasis	UCP1	-3826 A>G	AA			○	
	UCP2	-866 G>A	GG			○	
	UCP3	55 C>T	CC			○	
Epinephrine receptors - energy mobilisation	ADRB2	Arg16Gly	AG			◯◯	Ⓔ*
		Gln27Glu	CC		○	○	Ⓔ*
	ADRB3	Trp64Arg	TC			◯◯	◯◯
Dopamine receptor	DRD2	C>T	TT		◯◯◯	◯◯◯	
Taste sensitivity	TAS1R2	Ile191Val	AA		◯◯◯	◯◯◯	
	TAS2R38	Pro49Ala Ala262Val Val296Ile	Medium Taster			◯◯	
Snacking & satiety	MC4R	V103I	CC		◯◯◯	◯◯◯	
Circadian rhythms	CLOCK	3111 T>C	TT			○	
Blood flow & respiration	AGT	T>C	TT		○		○
	ACE	I>D	II		◯◯◯		Ⓔ*
	BDKRB2	C>T	TT				Ⓔ*
	VEGF	C>G	CG				○
Energy during exercise	NRF2	A>G	GG				Ⓔ*
	PPARGC1A	G>A	GG				Ⓔ*
	PPARA	G>C	CC				Ⓟ*
Fuel during exercise	TRHR	C>T	CC				○
Musculoskeletal properties	ACTN3	R>X	XR				Ⓟ*
Muscle cramping susceptibility	AMPD1	G>A	AG				◯◯
Collagen production	COL1A1	1546 G>T	GG	○			◯◯◯
	GDF5	C>T	TT				◯◯◯
	COL5A1	C>T	CT				◯◯

*The Ⓟ (Power) and/or Ⓔ (Endurance) impact in the exercise response column refers to a moderate or high gene impact in the Endurance and/or Power Potential section indicating a genetic benefit to you. See page 52 for more information on your Endurance and Power Potential results.

Your core priority areas – the detail

In this section, all of your genetic priorities per core area are again highlighted for you. This time, further detail is provided to describe the priority area, what it potentially means for you health-wise, and most importantly, what to do to support these areas.

Biological processes

Lipid metabolism

Risk of hypertriglyceridemia

Triglycerides are a type of fat, or lipid, found in your body, and can circulate in your blood. Triglycerides are made from excess calories that you have eaten. The formation of triglycerides is a way of storing energy that your body does not need to use right away. Having high triglyceride levels can lead to hardening and damage of your blood vessels and can increase your risk of heart disease and metabolic syndrome.

Your results

Your genotype does not increase risk for having high triglyceride levels.

Risk

TYPICAL ELEVATED

Outcomes

Follow healthy eating guidelines as discussed with your healthcare provider.

GENE VARIATION	GENE RESULT	GENE IMPACT
APOC3 3175 C>G	CC	○
APOE E2/E3/E4	E3/E3	○

Please note that APOE E2 carriers have increased predisposition for high triglyceride levels. APOE E3/E4 and E4/E4 genotype carriers, who generally have high impacts, will still receive a high impact here as this genotype affects overall lipid metabolism.

Risk of Dyslipidaemia and altered LDL:HDL ratio

Dyslipidaemia is considered the imbalance of the different types of fats, or lipids, in the blood. When doing a blood test, if the results show that your levels of HDL, or 'good' cholesterol, to LDL, or 'bad' cholesterol, are not within a healthy balanced range, it means you have dyslipidaemia. This is a risk factor for heart disease. Diet, lifestyle, and other environmental factors all interplay with your genes to determine your risk of having unbalanced blood lipid levels.

Your results

Your genotype does not increase your risk for having high cholesterol levels.

Risk

TYPICAL ELEVATED

Outcomes

Follow healthy eating guidelines as discussed with your healthcare provider.

GENE VARIATION	GENE RESULT	GENE IMPACT
APOE E2/E3/E4	E3/E3	○
APOC3 3175 C>G	CC	○
CETP 279 G>A	AG	●
LPL 1595 C>G	CC	○

Lipid oxidation

Lipid oxidation is the process whereby the different types of fat found in your blood vessels come under attack by free radicals. Smoking, being overweight, and having a high-stress lifestyle all increase the risk of having high free radicals in the body. The damage caused by free radicals changes the structure and function of the blood lipids, or fats, and leads to damage of blood vessels and arteries in the body. If there is a high level of lipid oxidation and damage constantly taking place, it increases the risk for heart disease.

Your results

Your genotype is linked with the normal function of this enzyme and no increased risk for lipid oxidation.

Risk

TYPICAL ELEVATED

Outcomes

Follow healthy eating guidelines as discussed with your healthcare provider.

GENE VARIATION	GENE RESULT	GENE IMPACT
PON1 A>G	GA	

Insulin sensitivity

Risk for type 2 diabetes

Type 2 diabetes is a chronic illness characterized by consistently higher levels of sugar (glucose) in the blood. This is due to an inability to regulate and use glucose as a fuel for vital body processes because the body does not produce or use insulin effectively. Major driving factors in the development of diabetes include being overweight, having a high waist circumference, being physically inactive, and having a genetic predisposition.

Your results

Your genotype indicates you have an elevated risk for type 2 diabetes.

Risk

TYPICAL ELEVATED

Outcomes

It is essential to manage weight through regular physical exercise. Replace saturated fats such as full cream dairy, butter, lard, fat on meat, and chicken skin with monounsaturated fats such as avocado, olive oil, and macadamia nuts. Moderate total carbohydrate intake, avoid all refined carbohydrates and increase fiber-rich foods.

GENE VARIATION	GENE RESULT	GENE IMPACT
PPARG Pro12Ala C>G	CG	✓
TCF7L2 C>T	TT	○○
SLC2A2 Thr110Ile C>T	TC	○
FTO T>A	AA	○○
IRS1 T>C	TT	✓
IRS1 G>A	AG	○

Methylation

Homocysteine and methionine regulation

Methylation is a simple but key biochemical process that regulates the functioning of several biological systems. Methylation is involved in regulating mood and sleep through production of neurotransmitters, supporting DNA replication for growth and repair, forming the supportive structures that wrap around our nerves, ensuring appropriate nervous system function and cognition, production of immune cells needed for protection against infections, and ensuring healthy cell structure and appropriate communication between cells. The actual process of methylation involves making the special building blocks that can be used in regulating the above-mentioned biological systems. Methylation is also essential to help switch genes on and off, and it plays an important role in protein metabolism and breaking down homocysteine, an amino acid which can become harmful when levels in the body become too high. The methylation process is dependent on "methyl-nutrients" including our B-vitamin family as well as choline and betaine. Poor levels of these nutrients, together with variation in genes involved in methylation, can lead to suboptimal functioning of this process and an increased risk for several disorders.

Your results

Your genotype results indicate that you are not at an increased risk for poor methylation.

Support

TYPICAL ELEVATED

Outcomes

Follow a healthy balanced diet as prescribed by your healthcare practitioner.

GENE VARIATION	GENE RESULT	GENE IMPACT
MTHFD1 1958 G>A	GG	○
MTHFR 677 C>T	CT	◐
MTHFR 1298 A>C	AA	○
MTR 2576 A>G	AG	◐
MTRR 66 A>G	AA	○
CBS 699 C>T	CC	○
COMT 472 G>A	GG	○

Oxidative Stress

Function of antioxidant enzymes

Antioxidants are compounds that can defend our body from damage and accelerated ageing. They neutralise unstable molecules called free radicals that damage the DNA and cells in our body. Antioxidants are found naturally in the body in the form of enzymes or antioxidant molecules that our bodies can make themselves. They can also be consumed in a wide variety of foods, especially from vegetables and fruit. By far, the main defence system against free radicals and oxidative stress damage, is our own internal antioxidant enzymes. Ensuring optimal production and functioning of our antioxidant enzymes will significantly reduce risk of disease and support overall good health and longevity.

Your results

Your genotype is linked to suboptimal function of antioxidant enzymes. You are at risk for poor antioxidant status and related oxidative stress-driven disorders.

Function

TYPICAL SUBOPTIMAL

Outcomes

It is important to manage weight, and follow a daily exercise routine that includes low to moderate intensity exercises. It is recommended to stop smoking. Ensure an intake of at least 7 portions of different coloured vegetables and fruit per day. Include selenium rich foods such as Brazil nuts, sardines and turkey and ensure adequate intake of oily fish (3 x per week). Consider antioxidant supplementation as recommended by your practitioner.

GENE VARIATION	GENE RESULT	GENE IMPACT
eNOS 894 G>T	GG	○
MnSOD/SOD2 47 T>C (Val16Ala)	CC	○○○
GPX Pro198Leu C>T	CT	○○
CAT -262 C>T	CC	✓

Detoxification

Phase I detoxification function

The detoxification process in the body has two phases. The enzymes involved in phase I detoxification are known as 'activators;' they activate the substance that needs to be removed, allowing the next phase to proceed. Phase I enzymes must exhibit just the right amount of activity for the detoxification process to be effective. Activated compounds in phase I are potentially harmful. If phase I detoxification works too quickly, the overflow of products from phase I detoxification cannot be dealt with effectively, causing damage to cells and increasing risk for disease.

Your results

Your CYP1A1 genotype is associated with normal phase 1 detoxification capacity. You are not at an increased risk for accelerated phase 1 detoxification.

Function

TYPICAL ACCELERATED

Outcomes

Follow standard dietary guidelines as prescribed by your healthcare provider.

GENE VARIATION	GENE RESULT	GENE IMPACT
CYP1A1 Ile462Val A>G	AA	○
CYP1A1 T>C	TT	○

Phase II detoxification function

The phase II detoxification enzymes that take over from phase I detoxification enzymes can be considered as 'neutralising' or 'excretory' enzymes because they initiate reactions leading to the excretion of toxins from the body. These enzymes bind the chemical compound glutathione to the 'active' toxins from phase I, making them water soluble so they can be excreted through sweat or urine. Decreased activity or deletion of these genes has been associated with gut health issues, skin sensitivities, and other chronic diseases of lifestyle.

Your results

You have decreased detoxification ability and therefore an increased risk for DNA damage.

Function

TYPICAL REDUCED

Outcomes

To support phase 2 detoxification, increase intake of a variety of fruits and vegetables, preferably organic, with a specific emphasis on daily intake of broccoli, cauliflower, and kale.

GENE VARIATION	GENE RESULT	GENE IMPACT
GSTM1 Insertion/Deletion	Deletion	○○○
GSTP1 313 A>G	AG	○
GSTT1 Insertion / Deletion	Deletion	○○○
NQ01 609 C>T	CC	○

Inflammation

Risk for chronic low-grade inflammation

Inflammation is a normal immune response and an essential step in tissue healing. The release of inflammatory chemicals and proteins is controlled by genes that govern inflammation. However, when these genes are not 'switched off' the inflammatory response continues beyond the point of healing, and can lead to a condition called chronic, low-grade inflammation. An increasing number of common disorders, such as obesity, heart disease, arthritis and inflammatory bowel disease have been associated with chronic low-grade inflammation.

Your results

Your genotype leads to an increased production of inflammation-prone markers, which is associated with an elevated risk of chronic, low-grade inflammation. This can be experienced as low mood, difficulty in losing weight, skin sensitivity, poor gut health and joint pain, as well as longer recovery time after strenuous exercise.

Risk

TYPICAL ELEVATED

Outcomes

It is important to follow a plant-based diet. Decrease intake of saturated fats, limit intake of omega 6 fatty acids, and increase intake of omega 3 fatty acids. Ensure you are eating a rainbow of vegetables and fruit daily. Include regular sessions of moderate-intensity exercise and ensure you are getting enough, good-quality sleep. Incorporate good stress management strategies.

GENE VARIATION	GENE RESULT	GENE IMPACT
CRP G>A	GG	○○
IL-1A 4845 G>T	GG	○
IL-1A -889 C>T	TC	○○
IL-1B 3954 C>T	CC	○
IL-1B -511 A>G	AA	○
IL-1RN 2018 C>T	TT	○○
IL-6 -174 G>C	CC	○○○
IL-6R A>C	CC	○○
TNFA -308 G>A	GG	○

Bone and joint health

Bone mineral density and osteoporosis risk

Our bones are not a fixed structure. Our cells work continuously to dissolve old bone and create new bone tissue. After the age of 30, both men and women start losing bone mass; the loss is particularly marked in women after menopause. Accelerated bone mass losses can increase the risk for having a low bone mineral density, eventually leading to osteoporosis. According to latest research both nutrition and genetic factors play an important role in determining bone health.

Your results

Your genotype results are linked to having an elevated risk for a low bone mineral density as well as being more susceptible to developing osteoporosis.

Risk

TYPICAL ELEVATED

Outcomes

Ensure adequate Vitamin D (mushrooms, fatty fish, egg yolks) and calcium (low-fat dairy, fatty fish, almonds) intake, and other 'bone-building' nutrients such as phosphorous, magnesium, boron, vitamin K, zinc, and manganese. Include load-bearing exercises to help maintain adequate bone mineral density. Ensure caffeine intake does not exceed 300mg per day (3 cups of coffee per day).

GENE VARIATION	GENE RESULT	GENE IMPACT
VDR FokI T>C	TT	○○○
VDR BsmI G>A	AA	○○○
VDR TaqI T>C	CC	○○○
COL1A1 1546 G>T	GG	○

Nutrition

Macronutrient requirements

Carbohydrate intake

A high carbohydrate intake has often been associated with an increased risk for obesity and insulin resistance, meaning that a high intake of carbohydrates may hinder your ability to lose weight. Certain gene variants are associated with weight loss resistance when there is a high dietary intake of carbohydrates.

Your results

Your gene results indicate that you may experience slower weight loss when you eat a diet high in carbohydrates.

Sensitivity

MODERATE-HIGH

GENE VARIATION	GENE RESULT	GENE IMPACT
ADIPOQ -11391 G>A	GG	○○
ADRB2 Gln27Glu C>G	CC	○
DRD2 C>T	TT	○○○
TAS1R2 Ile191Val G>A	AA	○○○
SLC2A2 Thr110Ile C>T	TC	○○

Outcomes

By managing the amount of carbohydrates in your diet, you will improve your weight loss outcomes and prevent weight regain. Avoid intake of starchy foods such as bread, pasta, and potato, rather opting for colourful vegetables and some fruit as a healthy carbohydrate source. Eliminate all refined carbohydrates, carbohydrate-based snacks and sugar-rich foods (sweets, crisps, biscuits etc.)

Food sources

CARBOHYDRATE SOURCE	Weight	g
White rice	100g	28
Brown rice	100g	23
Corn	100g	19
Breads	100g	49
Potato, baked	100g	21

Weight loss and heart health response to total fat and saturated fat intake

Saturated fats are a type of dietary fat which is typically semi-solid at room temperature. Foods high in saturated fat include baked goods, fried foods, animal fats including fatty or processed meats, whole-fat dairy products and fats like coconut oil, palm or palm kernel oils found in packaged foods. Certain gene variations have been associated with increased obesity risk and slower weight loss outcomes when there is a high saturated fat intake. Some gene variations are linked to increased inflammation risk with a high intake of animal fat foods.

Your results

According to your gene results, a high intake of saturated fat may lead to slower weight loss outcomes.

Sensitivity

MODERATE

GENE VARIATION	GENE RESULT	GENE IMPACT
FABP2 Ala54Thr G>A	GG	○
ADIPOQ -11391 G>A	GG	○○
PPARG Pro12Ala C>G	CG	○○
APOA2 -256 T>C	CT	○
TCF7L2 C>T	TT	○○○
FTO T>A	AA	○○○
APOA5 -1131 T>C	TT	○○
PLIN 11482 G>A	GG	○
MC4R V103I T>C	CC	○○○
TNFA -308 G>A	GG	○

Outcomes

Decrease total saturated fat intake by avoiding full-fat dairy products (cream, butter, hard cheese) and fatty meats (limit red meat intake to 2 times per week), and eliminate deep fried foods from the diet.

Food sources

SATURATED FAT CONTENT	Portion	g
Butter	1 Tbs	7
Chicken breast with skin	1 medium	2.5
Beef sirloin steak	100g	6
Milk, whole	1 glass	5
Coconut oil	1 Tbs	12

Weight loss response to mono-unsaturated fat intake

Mono-unsaturated fats (MUFA) are a type of unsaturated fat that have significant health benefits; these can be found in olive oil, avocados, and certain nuts. Particular gene variants have been associated with lower body weight when there is a higher intake of mono-unsaturated fats in the diet (approximately >13% of total calories). Benefits are seen if mono-unsaturated fats replace saturated fats or carbohydrates in the diet - i.e., replacing other calories, rather than adding extra calories to your diet. Genetic variants in certain genes have been associated with a lower body weight in individuals when more than 13% of their calories come from mono-unsaturated fats.

Your results

According to your genetic results, this is a low priority for you.

Benefit

TYPICAL ENHANCED

GENE VARIATION	GENE RESULT	GENE IMPACT
FABP2 Ala54Thr G>A	GG	○
ADIPOQ -11391 G>A	GG	○○
TCF7L2 C>T	TT	○○○

Outcomes

Standard guidelines for mono-unsaturated fat intake are recommended.

Food sources

MUFA CONTENT	Portion	g
Olive oil	1 Tbs	1.4
Olives	30g	2.31
Avocado pear	1 medium	15
Almonds	30g	11.2
Peanut butter	2 Tbs	8

Polyunsaturated fat requirements for health and weight loss response

Genetic variants in certain genes have been associated with a lower body weight in individuals when there is a higher intake of polyunsaturated fats in the diet, with a focus on omega-3 fatty acids. Polyunsaturated fats (PUFA) are essential for brain function and managing inflammation. The best source of omega-3 fatty acids is fatty fish like salmon, sardines, or pilchards. Other sources include pine nuts, walnuts, and flax- and sunflower seeds. Genetic variants in certain genes have been associated with improved weight management outcomes when there is a higher intake of polyunsaturated fats in the diet, with a focus on omega-3 fatty acids, while at the same time limiting the total saturated fat intake.

Your results

Your genes show that you may have a beneficial response with weight management when you increase your total PUFA intake and there is a higher ratio of PUFA:SFA (saturated fatty acids) in the diet.

Benefit

TYPICAL ENHANCED

GENE VARIATION	GENE RESULT	GENE IMPACT
PPARG Pro12Ala C>G	CG	○○
FTO T>A	AA	○○○
TNFA -308 G>A	GG	○
FADS1 G>T	GT	○○

Outcomes

Replace a majority of your saturated fat intake with polyunsaturated fats such as various fish and seeds. Good quality PUFA sources include a variety of nuts and seeds, nut butters, and fatty fish.

Food sources

PUFA CONTENT	Portion	g
Walnuts	14 halves	13
Flaxseed, ground	1 Tbs	2
Sunflower seeds	15g	3
Salmon, atlantic raw	100g	3.9
Pilchards, tinned	100g	1.8

Protein intake

Our body needs dietary protein to supply amino acids for the growth and maintenance of our cells and tissues. There are a total of 20 amino acids, 9 of which are essential, meaning that the body cannot make them, and they need to be consumed through the diet. Different protein sources are considered better quality if they include more of these essential amino acids. Typically, animal proteins provide more of these essential amino acids. This does not mean that you are unable to consume sufficient protein if you do not eat animal products, but instead you may have to eat greater quantities and a greater variety of plant proteins or consider supplementation. Good sources of protein include lean ground beef, chicken breasts, salmon, whole eggs, chickpeas, lentils, soy such as tofu, and red kidney beans.

Your results

Protein intake is a high benefit for you. You may have a beneficial weight management response when there is a higher protein intake in your diet.

Benefit

TYPICAL ENHANCED

GENE VARIATION	GENE RESULT	GENE IMPACT
FTO T>A	AA	○○○

Outcomes

Follow a higher protein diet for weight management. Increase your protein intake to meet approximately 25% of total energy intake. Focus on plant-based and lean sources of protein.

Food sources

SOURCE OF FOOD	Portion	g
Beef	100g	26
Goat's meat	100g	27
Chicken	100g	27
Fish	100g	27
Whole egg	1	6

Micronutrient requirements

Vitamin A

Vitamin A is a fat-soluble vitamin and essential for human life. Vitamin A has several crucial functions in the body. It helps cells reproduce normally, it is essential for good vision, assists with wound healing and bone formation, and supports the immune system. As humans, we do not make vitamin A and need to obtain it from the diet as provitamin A, such as beta-carotene. Once taken up, it is processed into active vitamin A and/or stored for future processing to perform its functions when needed. The ability to convert provitamin A into active vitamin A is dependent on the enzyme β-carotene 15,15'-oxygenase. This conversion can be altered because of genetic variations in the enzyme-coding gene, BCO1, which can result in an individual having high levels of provitamin A and low levels of active vitamin A.

Your results

You do not have any increased requirements for Vitamin A.

Requirements

NO INCREASED

GENE VARIATION	GENE RESULT	GENE IMPACT
BCO1 G>T	GT	○○
BCO1 Ala379Val C>T	CC	○

Outcomes

Ensure adequate intake of yellow, orange, and green leafy fruits and vegetables.

Food sources

RECOMMENDED DIETARY ALLOWANCE	Male	Female
	900mcg	700mcg

SOURCE OF FOOD	Portion	mcg
Sweet potato with skin (cooked)	1 medium (151g)	1190
Carrots (raw)	1 cup (120g)	1000
Squash (cooked)	100g	558
Tuna (cooked)	75g	491-568
Eggs	2 large eggs	190-252

Vitamin B2

Vitamin B2, also known as riboflavin, is a water-soluble vitamin that is found in a variety of foods including salmon, milk, and spinach. Vitamin B2 plays an important role in the production of energy, protecting DNA from getting damaged, and it is needed to help the body change vitamin B6 and folate into more usable forms. It is also important for growth and red blood cell production. Our body is unable to make this essential nutrient itself, so we must get adequate amounts of vitamin B2 through dietary intake.

Your results

Your genotype combination leads to normal functioning of both these enzymes, which is linked to typical requirements of vitamin B2, with no increased risk of deficiency due to genetics.

Requirements

NO INCREASED

GENE VARIATION	GENE RESULT	GENE IMPACT
MTHFR 677 C>T	CT	○○
MTHFR 1298 A>C	AA	○
MTRR 66 A>G	AA	○

Outcomes

Follow standard dietary guidelines to ensure adequate intake of vitamin B2-rich foods.

Food sources

RECOMMENDED DIETARY ALLOWANCE	Male	Female
	1.3mg	1.1mg

SOURCE OF FOOD	Portion	mg
Beef steak	100g	0.9
Low fat milk	475ml	0.9
Salmon	100g	0.5
Tofu	100g	0.4
Spinach (cooked)	250ml	0.4

Vitamin B6

Vitamin B6 is a water-soluble vitamin that is naturally present in many foods. The richest sources of vitamin B6 include fish, beef liver and other organ meats, potatoes and other starchy vegetables, and fruit. This vitamin performs many functions in the body. One of its main roles is to help the body metabolise proteins, fats, and carbohydrates for energy. Vitamin B6 is also involved in brain development, immune function and in maintaining normal levels of homocysteine, an amino acid which can become harmful when levels become too high in the body. Insufficient vitamin B6 intake can increase the risk of cardiovascular disease and cognitive decline.

Your results

Your genotype combination shows suboptimal functioning of these enzymes, which means you may develop an insufficiency for vitamin B6, which can be experienced as low energy, low mood and getting sick more often.

Requirements

NO INCREASED

GENE VARIATION	GENE RESULT	GENE IMPACT
MTHFR 677 C>T	CT	○○
CBS 699 C>T	CC	○

Outcomes

Increase your intake of vitamin B6-rich food sources such as lean chicken, tofu and bananas, to reach a requirement of 1.3 to 1.7mg per day. A vitamin B-complex supplement could be considered, but first speak to your healthcare provider for advice on a good quality supplement and whether vitamin B6 supplementation is necessary based on a full assessment of your personal needs.

Food sources

RECOMMENDED DIETARY ALLOWANCE	Male	Female
	1.3-1.7mg	1.3-1.5mg

SOURCE OF FOOD	Portion	mg
Salmon	100g	0.9
Lean chicken breast	100g	0.9
Tuna	1 can	0.8
Tofu	100g	0.5
Banana	100g	0.5
Avocado	1 (150g)	0.4

Folate

Folate, also known as vitamin B9 or folic acid in its synthetic form, is a water-soluble vitamin that is found in green leafy vegetables. Folate plays an important role in helping to make and repair DNA and for proper cell growth. It is also essential for red blood cell formation and function. It is crucial for pregnant women to get sufficient folate to support foetal growth. Folate also supports good heart health, and mental health, decreasing risk for depression and dementia, and it may reduce the risk of various cancers. Our body is unable to make this essential nutrient itself, so we must get adequate amounts of folate through dietary intake or, when indicated, through supplementation.

Your results

Your genotype combination shows suboptimal functioning of these enzymes, which means you could become insufficient in folate. This can be experienced as weakness, fatigue, difficulty concentrating, and low mood.

Requirements

NO INCREASED

GENE VARIATION	GENE RESULT	GENE IMPACT
MTHFR 677 C>T	CT	◯◯
MTHFR 1298 A>C	AA	◯
MTR 2576 A>G	AG	◯
MTRR 66 A>G	AA	◯
MTHFD1 1958 G>A	GG	◯

Outcomes

Increase your intake of folate-rich food sources such as edamame and bayam, to reach a requirement of 400 mcg per day. Note that if you are pregnant, or planning to fall pregnant, this is a very important nutrient for you and your growing baby, and your requirements will be increased. A vitamin B-complex supplement could be considered, but first speak to your healthcare provider for advice on a good quality supplement and whether folate supplementation is necessary based on a full assessment of your personal needs.

Food sources

RECOMMENDED DIETARY ALLOWANCE	Male	Female
	400mcg	400mcg

SOURCE OF FOOD	Portion	mcg
Beef liver	100g	258
Beans	100g	147
Edamame beans (cooked)	125ml	106-255
Spinach (raw)	100g	116
Broccoli	125ml	89
Lettuce	250ml	65-80

Vitamin B12

Vitamin B12 or cobalamin is an essential nutrient that is naturally found in foods of animal origin, including fish, meat, eggs, and dairy products. It is usually bound to the protein in food and must be released before it can be absorbed by the body. Vitamin B12 plays a critical role in development, functioning of the central nervous system, healthy red blood cell formation, and DNA synthesis. Variations in the genes involved in the absorption, transport, cellular uptake, and metabolism of vitamin B12 can lead to altered vitamin B12 status. A deficiency of vitamin B12 has been linked to health complications including an increased risk of neuropsychiatric symptoms, cardiovascular diseases, and the onset of different forms of cancer.

Your results

Your genotype combination shows suboptimal functioning of these enzymes, which means you could develop an insufficiency in vitamin B12. This can be experienced as fatigue, headaches, low mood, difficulty concentrating, and pins-and-needles in hands and feet.

Requirements

NO INCREASED

GENE VARIATION	GENE RESULT	GENE IMPACT
FUT2 Gly258Ser G>A	GG	○○○
MTRR 66 A>G	AA	○

Outcomes

Increase your intake of vitamin B12-rich food sources such as tuna and eggs, to reach a requirement of 4 mcg per day. Note that if you are vegan, elderly, pregnant, or planning to fall pregnant, it may be more difficult to reach your requirements of vitamin B12. A vitamin B-complex supplement could be considered, but first speak to your healthcare provider for advice on a good quality supplement and whether vitamin B12 supplementation is necessary based on a full assessment of your personal needs. Consider a probiotic to manage gut health.

Food sources

RECOMMENDED DIETARY ALLOWANCE	Male	Female
	2.4mcg	2.4mcg

SOURCE OF FOOD	Portion	mcg
Tuna (cooked)	75g	8.2-9.3
Salmon (cooked)	75g	2.1-4.4
Minced beef (cooked)	75g	2.4-2.7
Egg	2 large eggs	1.1-1.6
Milk (whole)	1 cup (250ml)	1.2-1.4

Choline

Choline is a nutrient that is found in many foods such as meat, eggs, poultry, fish, and dairy products. It has a vital role to play in regulating memory, mood, and muscle control. Choline is also an important component of your cell's outer membranes, ensuring the structural integrity and signaling functions of the cell. A small amount of choline is produced in the liver, but this is not sufficient to meet our body's needs. Sufficient choline must be obtained from the diet. Inadequate choline levels could increase the risk of cardiovascular disease and neurological conditions.

Your results

Your genotype leads to normal functioning of this enzyme, which is linked to typical requirements of choline, with no increased risk of deficiency due to genetics.

Requirements

NO INCREASED

GENE VARIATION	GENE RESULT	GENE IMPACT
MTHFD1 1958 G>A	GG	○

Outcomes

Follow standard dietary guidelines to ensure adequate intake of choline-rich foods.

Food sources

ADEQUATE INTAKE	Male	Female
	550mg	425mg

SOURCE OF FOOD	Portion	mg
Egg	1 egg	147
Soybeans (cooked)	1 cup (185g)	82
Chicken breast	85g	72
Salmon	85g	67
Milk (whole)	1 cup (250ml)	43

Vitamin C

Vitamin C is an essential vitamin naturally present in some foods, such as fresh fruits and vegetables, especially citrus fruits. The human body is unable to make vitamin C itself, so it is an essential nutrient we must take in from our diet. Vitamin C is needed for the growth and repair of tissues, repair and maintenance of cartilage, bones, and teeth and facilitates the absorption of iron. It plays a key role in immune function and limits the damaging effects of free radicals through its antioxidant activity. A deficiency of vitamin C can result in oxidative stress-related conditions such as cardiovascular disease, neurodegenerative diseases, and cancer.

Your results

A deletion in the gene means that you are more susceptible to vitamin C insufficiency. This may be experienced as poor wound healing, dry hair and dull skin, lower immunity and irritability.

Requirements

NO — INCREASED

GENE VARIATION	GENE RESULT	GENE IMPACT
GSTT1 Insertion/Deletion	Deletion	○○○

Outcomes

Increase your intake of vitamin C-rich food sources such as guava and kiwi to meet a minimum requirement of 75 to 90 mg per day. Vitamin C supplementation could be considered, but first speak to your healthcare provider for advice on a good quality supplement and what is best for you based on a full assessment of your personal needs.

Food sources

RECOMMENDED DIETARY ALLOWANCE	Male	Female
	90mg	75mg

SOURCE OF FOOD	Portion	mg
Guava	165g	377
Bell pepper	1 cup chopped (149g)	120
Papaya	140g	87
Orange	1 fruit (154g)	87
Kiwi	1 fruit (75g)	56

Vitamin D

Vitamin D, referred to as calciferol, is a fat-soluble vitamin that is naturally present in a few foods, but also produced in our bodies when ultraviolet (UV) rays from sunlight strike the skin and trigger vitamin D synthesis. Vitamin D is essential for supporting good bone, teeth, and muscle health. It also plays important roles in foetal programming and nerve development, facilitates insulin secretion to control blood sugar levels, and supports immune function.

Your results

Your genotypes lead to altered function in the vitamin D metabolism pathway, which means you are susceptible to a vitamin D insufficiency.

Requirements

NO — INCREASED

GENE VARIATION	GENE RESULT	GENE IMPACT
CYP2R1 A>G	AA	○
GC T>G	TT	○○○
GC 1296 G>T	TT	○○○

Outcomes

Increase your intake of vitamin D-rich food sources such as salmon and canned tuna to meet a minimum requirement of 600 IU per day. Being outdoors in the sun for half an hour will also assist in improving vitamin D levels. Vitamin D supplementation could also be considered, but first speak to your healthcare provider for advice on a good quality supplement and what is best for you based on a full assessment of your personal needs.

Food sources

RECOMMENDED DIETARY ALLOWANCE	Male	Female
	600 IU	600 IU

SOURCE OF FOOD	Portion	IU
Mushrooms (Maitake) (raw)	1 cup diced (70g)	784 IU
Trout	1 fillet (79g)	502IU
Salmon	100g	450 IU
Tuna	1 can	270 IU
Egg yolk	1 (egg)	40 IU

Calcium

Calcium is a major constituent of our bones, providing strength and structure. Our bones are the main storage site of calcium and the regulation of calcium release is important for maintaining healthy cellular levels of calcium in our bodies. Ensuring adequate intake of calcium in the diet from a young age will help to build strong bones and decrease risk of developing low bone mineral density later in life. How our bodies absorb calcium is, to some extent, genetically determined.

Your results

Your genotype is linked with a decreased function of the receptor, which may hinder calcium absorption. Insufficient calcium can be experienced as poor dental health, brittle hair and nails with white spots on your nails.

Requirements

NO INCREASED

GENE VARIATION	GENE RESULT	GENE IMPACT
VDR FokI T>C	TT	○○○
VDR BsmI G>A	AA	○○○
VDR TaqI T>C	CC	○○○

Outcomes

Increase intake of calcium-rich foods to support bone health and meet requirements of 1200mg per day. Good food sources include cow's milk and yogurt, tofu and canned salmon.

Food sources

RECOMMENDED DIETARY ALLOWANCE	Male	Female
	1000-1200 mg	1000-1200 mg

SOURCE OF CALCIUM	Portion	mg
Cow's milk	1 glass	275–350
Yoghurt	250g	260
Tofu	100g	350
Spinach	1 cup	250
Canned salmon	1 can	350

Iron overload (hemochromatosis)

Hereditary hemochromatosis is a genetic disorder in which there is excessive accumulation of iron in the body, leading to iron overload. In individuals with the disorder, the daily absorption of iron from the intestines is greater than the amount needed to replace losses. Since the normal body cannot increase iron excretion, the absorbed iron builds up in the body. This extra iron can cause damage to organs such as the heart, liver, and pancreas. While some individuals, with the genes for hemochromatosis, do not show signs and symptoms of the disease, others may show severe symptoms such as joint pain, erectile dysfunction, heart failure, fatigue, and darkening of skin colour. Although it can cause serious problems, it is a very treatable condition, especially when identified early.

Your results

Your HFE genotype is related to normal functioning of this protein and a typical ability to regulate iron levels in the body. There is no increased risk for iron overload.

Risk

NO — INCREASED

GENE VARIATION	GENE RESULT	GENE IMPACT
HFE C282Y & H63D	282CC & 63HH	○

Outcomes

Follow standard dietary guidelines for iron-rich foods in conjunction with recommendations by your healthcare practitioner.

Food sources

RECOMMENDED DIETARY ALLOWANCE	Male	Female
	8-11mg	8-18mg

SOURCE OF FOOD	Weight	mg
Lentils	100g (canned)	3.1
Beef, roast	100g	2.89
Clam (shellfish)	100g	1.95
Spinach (raw)	100g	1.26
Broccoli	100g	0.69

Food intolerance and sensitivity

Lactose intolerance

Many adults are genetically predisposed to not be able to digest larger quantities of milk or milk products. This is known as lactose intolerance. Lactose, a sugar found in milk, is broken down by an enzyme called lactase, found in the small intestines. This enzyme is produced by the LCT or lactase gene. For many people, the production of this enzyme stops before adulthood, however this is dependent on your genes. Individuals who suffer from this condition may experience abdominal cramps, bloating, nausea, flatulence, and diarrhoea.

Your results

Your genotype is linked with the ability to continue to make the enzyme responsible for breaking down lactose, the sugar in milk. You should not experience adverse effects (stomach cramps and bloating) to milk intake as long as your overall gut health is good.

Tolerance

TOLERANT INTOLERANT

GENE VARIATION	GENE RESULT	GENE IMPACT
MCM6 -13910 C>T	TC	

Outcomes

Follow standard dietary guidelines in conjunction with recommendations by your healthcare practitioner.

Food sources

Some lactose intolerant individuals can tolerate up to 12 g of lactose per day, which is equivalent to 1 cup of milk

SOURCE OF FOOD	Portion	g
Cow's milk	1 cup	12
Goat's milk	1 cup	11
Flavoured milk	1 cup	10
Yoghurt	¾ cup	7
Ice cream	½ cup	5

Gluten intolerance (coeliac disease risk)

Coeliac disease (CD) is a common, autoimmune disorder in which the small intestine is damaged in response to a severe gluten intolerance. Gluten is the protein found in grains such as wheat, barley, and rye. Classical symptoms of coeliac disease include diarrhoea, bloating, and wind, which is triggered by gluten ingestion. Other less typical signs of gluten intolerance include fatigue, anaemia, and osteoporosis.

Your results

You have an increased risk for coeliac disease and non-coeliac gluten sensitivity based on your genotype result.

Risk

NO INCREASED

GENE VARIATION	GENE RESULT	GENE IMPACT
HLA DQ2/DQ8	DQ2.5 &	○○○

Outcomes

If you find that you suffer from related symptoms, consider a gluten free diet. Gluten free grains include quinoa and buckwheat. Avoid gluten-containing foods and grains such as wheat, rye, oats and barley. Consult with a dietitian for guidelines on following a gluten free diet.

Food sources

MAJOR SOURCES OF GLUTEN
Wheat-based breads
Pasta
Baked goods
Cereal
Crackers & crisps

Alcohol metabolism

Alcohol metabolism is a complex process with large differences in absorption, distribution, and elimination between different people. Alcohol is first broken down into acetaldehyde, which is highly toxic and is known to cause cancer. Acetaldehyde is then further broken down into a less harmful compound called acetate, by the aldehyde dehydrogenase 2 (ALDH2) enzyme. From there it can be broken down into water and carbon dioxide for easy elimination. The damaging effects of alcohol are directly related to the blood-alcohol levels achieved after alcohol intake, as well as the ability to break down and remove the highly toxic product of alcohol metabolism, acetaldehyde. This depends on the genetic variations found in the gene encoding ALDH2, as well as environmental factors, such as the amount of alcohol you consume.

Your results

Your genotype shows normal functioning of this enzyme.

Rate of breakdown

TYPICAL SLOW

GENE VARIATION	GENE RESULT	GENE IMPACT
ALDH2 G>A	GG	○

Outcomes

Follow standard dietary guidelines in conjunction with recommendations by your healthcare practitioner. If you drink alcohol, drink in moderation.

Food sources

PERCENTAGE OF ALCOHOL	
Cider	5%
Beer	2-8%
Wine	10-20%
Sake / soju	20-40%
Vodka and tequila	40%
Brandy and gin	35-55%

Caffeine sensitivity

Caffeine is the most widely used stimulant and is found in relatively high amounts in coffee and energy drinks. Coffee and caffeine affect different people in different ways. There is strong evidence to support personalised guidelines when it comes to caffeine intake and recommendations. For some people, a high caffeine intake is linked to increased risk for heart disease and spikes in blood pressure, whereas improved exercise performance is experienced by other individuals. Others may experience poor sleep and anxiety related to a higher caffeine intake. Responsiveness to caffeine is thus largely genetically dependant.

Your overall results

Your genotype indicates you may experience adverse effects to a high caffeine intake. Due to the variants that you carry, a high caffeine intake may increase risk for heart disease, spike blood pressure, increase feelings of anxiety, and predispose to a lower bone mineral density.

Caffeine sensitivity

TYPICAL SENSITIVE

Outcomes

Limit caffeine consumption to a maximum of 200mg per day. This equates to no more than 2 cups of coffee per day.

Food sources

SOURCE OF FOOD	Portion	mg
Brewed coffee	1 cup /240ml	95
Instant coffee	1 cup /240ml	60
Black tea	1 cup /240ml	45
Soda (cola)	350ml can	40
Chocolate (dark)	30g	24

Caffeine sensitivity: Bone health

Caffeine consumption can impact your bone health. A high caffeine intake has been reported to interact with calcium absorption and decrease bone mineral density, increasing risk of fractures.

Your results

Your genotype is linked to a change in the receptor function and a decreased ability to absorb calcium when caffeine intake is high.

Caffeine sensitivity

TYPICAL SENSITIVE

Outcomes

Limit all caffeine to less than 300mg per day, which is equivalent to drinking 2 to 3 cups of filter coffee.

GENE VARIATION	GENE RESULT	GENE IMPACT
VDR Fok1 T>C	TT	○○○
VDR Bsm1 G>A	AA	○○○
VDR Taq1 C>T	CC	○○○

Caffeine sensitivity: Anxiety and sleep

Caffeine can increase your heart rate, blood pressure and stress hormone levels, which is similar to what happens when under high stress conditions. Some individuals tend to break down these stress hormones at a slower rate, and a high caffeine intake can hinder this break-down process even further. Your genotype will influence whether you are someone who feels more anxious and struggles to sleep after excess caffeine consumption or drinking coffee too late in the day.

Your results

Your genotype results in a normal functioning enzyme, which means you should not be hyper-sensitive to caffeine intake with regards to anxiety, jitters and ease falling asleep after caffeine intake.

Caffeine sensitivity

TYPICAL SENSITIVE

Outcomes

Follow standard healthy guidelines for tea and cofffee intake and other caffeinated beverages.

GENE VARIATION	GENE RESULT	GENE IMPACT
COMT 472 G>A	GG	○

Caffeine sensitivity: Performance

Moderate doses of caffeine intake have been reported to improve both sprint and endurance performance. In terms of athletic performance and benefits, how you respond to caffeine is dependent on whether you are a fast or slow caffeine metaboliser and on your habitual caffeine intake.

Your results

Your sports performance is not influenced by caffeine intake.

Caffeine response

NON-RESPONDER POSITIVE RESPONDER

Outcomes

Limit coffee intake to less than 3 cups per day, or drink decaffeinated coffee instead.

GENE VARIATION	GENE RESULT	GENE IMPACT
CYP1A2 A>C	CA	○○

Caffeine sensitivity: Heart health

Caffeine intake can cause spikes in blood pressure and can increase risk of heart disease depending on whether you are a fast or slow metaboliser of caffeine.

Your results

Your genotype result indicates that you have a reduced ability to metabolise caffeine. Due to this, when drinking coffee, you may experience spikes in blood pressure and there is an increased risk of heart disease.

Caffeine sensitivity

TYPICAL SENSITIVE

Outcomes

Limit coffee intake to less than 3 cups per day, or drink decaffeinated coffee instead.

GENE VARIATION	GENE RESULT	GENE IMPACT
CYP1A2 A>C	CA	○○

Salt sensitivity

Salt sensitivity is a measure of how one's blood pressure responds to salt intake. Certain genetic variations can predispose individuals to salt sensitivity. If you are salt-sensitive, then you are at a higher risk of having spikes in your blood pressure when you consume foods high in salt. This is especially harmful if you already suffer from high blood pressure (hypertension), as high blood pressure is a major risk factor for heart disease and stroke.

Your results

Your genotype makes you more sensitive to salt intake and can lead to spikes in blood pressure with higher salt intake.

Salt sensitivity

TYPICAL SENSITIVE

GENE VARIATION	GENE RESULT	GENE IMPACT
ACE I>D	II	○○○
AGT T>C	TT	○

Outcomes

Significantly reducing your salt intake will be beneficial to your health if you suffer from hypertension.

Food sources

SALT CONTENT	Portion	mg
Instant noodle	1 pack	1000-1200
Chicken broth	240ml	782
Canned soup	1 can	700
Tomato ketchup	¼ cup	321
Salted fish	100g	200

Weight management

Weight and body composition management

Risk for obesity

Obesity risk refers to the contribution of your genotype predisposing you to becoming overweight/obese and provides insight to responsiveness to a weight management programme.

Your results

Your genetic risk score for obesity indicates you may gain weight more easily when exposed to an obesogenic environment - being physically inactive and taking in more calories than you need on a daily basis.

Risk

MODERATE

Outcomes

Follow the diet plan that is most appropriate for you, combined with adequate exercise.

GENE VARIATION	GENE RESULT	GENE IMPACT
ADIPOQ -11391 G>A	GG	○○
ADRB2 Arg16Gly A>G	AG	○○
APOA2 -256 T>C	CT	○
APOA5 -1131 T>C	TT	○○
FABP2 Ala54Thr G>A	GG	○
PPARG Pro12Ala C>G	CG	○○
PLIN 11482 G>A	GG	○
UCP1 -3826 A>G	AA	○
UCP2 -866 G>A	GG	○
UCP3 55 C>T	CC	○

GENE VARIATION	GENE RESULT	GENE IMPACT
ADRB2 Gln27Glu C>G	CC	○
DRD2 C>T	TT	○○○
SLC2A2 Thr110Ile C>T	TC	○○
TAS1R2 Ile191Val G>A	AA	○○○
FTO T>A	AA	○○○
MC4R V103I T>C	CC	○○○
TCF7L2 C>T	TT	○○○
ADRB3 Trp64Arg T>C	TC	○○
CLOCK 3111 T>C	TT	○
TNFA -308 G>A	GG	○

Circadian rhythm influence on weight and exercise performance

CLOCK is an essential element of the human biological clock and is involved in metabolic regulation. Your biological clock can influence the time of day you are likely to achieve your best performance.

Your day-night cycle (i.e. when you are awake and when you go to sleep and how well you sleep) plays a major role in regulating hormone levels such as insulin and cortisol, appetite control, weight management and overall health. Your genes plus your environment determine your unique circadian rhythm.

Your results

Your TT genotype suggests that you are more likely to be a morning person - you may prefer waking up early and getting to bed early. You may enjoy exercising earlier in the day.

Preference

MORNING PREFERENCE

Outcomes

Establish a morning exercise routine.

GENE VARIATION	GENE RESULT
CLOCK 3111 T>C	TT

Bitter taste

Taste is an important determinant of food acceptance or rejection behaviour. Interindividual variability in bitter taste sensitivity can strongly influence food preferences, nutritional status, and health.

Your results

This combination of genotypes for the TAS2R38 gene results in a 'medium-taster' phenotype, meaning individuals are able to taste the bitter compounds in food. Medium tasters have been associated with having a decreased intake of vegetables, especially dark green leafy vegetables, and a preference for sweet foods. There has also been a link with medium tasters and an increased risk for having a higher BMI, and possibly colon cancer. Increase awareness of this preference, and encourage vegetable intake. More palatable vegetable options with the use of other ingredients may improve compliance.

Sensitivity

TYPICAL ELEVATED

Outcomes

Choose young vegetables, earlier in the season that are less bitter. Prepare vegetables with herbs and spices to make them more palatable.

GENE VARIATION	GENE RESULT	GENE IMPACT
TAS2R38 Pro49Ala	Medium Taster	○○
TAS2R38 Ala262Va		
TAS2R38Val296Ile		

Sweet tooth

Having a “sweet tooth” can be described as craving, or seeking out, sweet foods. This has been linked to an increased risk for being overweight/obese.

Your results

Your genotype combination influences your ability to taste sweet foods, and may contribute toward you having a "sweet tooth", described as craving, or seeking out, sweet foods.

Sweet tooth

TYPICAL ENHANCED

Outcomes

It is important to try to completely avoid all high-sugar foods such as sweets, pastries, cakes and sweetened beverages. It would also be prudent to avoid artificially sweetened foods and drink to help sensitise your 'sweet' taste buds.

GENE VARIATION	GENE RESULT	GENE IMPACT
TAS1R2 Ile191Val G>A	AA	○○○
SLC2A2 Thr110Ile C>T	TC	○○

Snacking and satiety

Satiety can be described as the feeling of fullness after a meal. Some individuals have an increased tendency to snack more often and to experience reduced feelings of satiety

Your results

You may have a tendency for increased snacking behaviour and experience reduced feelings of satiety.

Snacking behaviour

TYPICAL ELEVATED

GENE VARIATION	GENE RESULT	GENE IMPACT
TCF7L2 C>T	TT	○○○
MC4R V103I T>C	CC	○○○
FTO T>A	AA	○○○

Outcomes

Try not to skip meals, opt for healthy snacks such as vegetables and fibre-rich foods, and make use of mindful eating techniques (sit at a table for all meals, eat only what is plated, don't eat on-the-run or in front of the TV, don't snack directly from the cupboard or fridge).

Food sources

Healthy snacking

REPLACE	WITH
Ice cream with toppings	Low fat yoghurt with berries
Pizza slice	Sandwich with animal protein and vegetables
Pasta salad	Fresh vegetables with low fat dip
Nachos and cheese dip	Whole wheat crackers
Potato crisps	Popcorn original

Exercise response

Exercise requirements for weight loss

Many people believe that if they are doing some sort of exercise and eating healthy, they will lose weight. In theory this is correct, but our genes tell a bit of a different story. Surprisingly, the amount and intensity of exercise you do, can play a key role in whether your weight loss journey will be successful.

Your results

In order to gain the most value from exercise in terms of weight loss, a MODERATE-INTENSITY exercise program of 3 x 60-minute sessions a week is suggested for you. These can be broken down into 6 x 30-minute sessions or other possible variations.

Intensity

MODERATE

GENE VARIATION	GENE RESULT	GENE IMPACT
ADRB2 Arg16Gly A>G	AG	○○
ADRB2 Gln27Glu C>G	CC	○
ADRB3 Trp64Arg T>C	TC	○○
FTO T>A	AA	○○○
PPARG Pro12Ala C>G	CG	○○

Outcomes

Try aiming to reach your step goal daily - achieving 10 000 steps per day will be of significant benefit, and aiming for a minimum of 24 MET Hours of exercise per week (split into 4 to 5 sessions) will optimise weight management.
One of the most important elements is the intensity of your workout. But how do you know if you're working at a moderate intensity level? There's no precise definition, but there are ways to monitor how hard you're working: for example, if you are working at a moderate intensity level, you should be short of breath and not able to speak more than one sentence at a time. If you can hold a steady conversation during your training, you have not reached the desired moderate intensity. The energy expenditure will be different for every single person as it depends on a multitude of factors such as age, gender, body composition, and current level of fitness. Something that might seem very easy for you, may be much more difficult for someone else.

Endurance and power potential

Some people respond better to specific exercises than others. This is because our unique genetic profile can affect physiological processes that impact the amount of benefit we each get from power or endurance training. Power uses strength to overcome resistance, while endurance refers to sustained effort with no reduction in performance. Power or anaerobic exercise are generally short in length with high intensity. Power exercise breaks down glucose for energy without using oxygen i.e. a lot of energy is released within a small period and your oxygen demand surpasses the oxygen supply. Power sports such as Olympic lifting, long jump and shotput, require a huge amount of explosive force.

Endurance training or aerobic exercise (also known as "cardio") requires pumping of oxygenated blood by the heart to deliver oxygen to working muscle. It stimulates the heart rate and breathing rate to increase in a way that can be sustained for the entire exercise session. Examples include cardio machines, cycling, running, swimming, walking, hiking, aerobics classes, dancing, cross country skiing and kickboxing. Consider your genetic results in the context of your current health and performance goals and tailor your exercise plan appropriately, keeping in mind the importance of sport-specific training.

Your results

You are likely to have enhanced performance benefits from a well-balanced ratio of both long-duration endurance-style exercises as well as high-intensity, short-duration power exercises.

Training potential

GENE VARIATION	GENE RESULT	GENE IMPACT	
		power	endurance
AGT T>C	TT	○	
ACE I>D	II		○○○
BDKRB2 C>T	TT		○○○
VEGF C>G	CG	○	○
NRF2 A>G	GG		○○○
PPARGC1A G>A	GG		○○○
PPARA G>C	CC	○○○	
ADRB2 Arg16Gly	AG		○○
ADRB2 Gln27Glu	CC		○○○
TRHR C>T	CC	○	
ACTN3 R>X	XR	○○	
VDR Taq1 T>C	CC	○○	

Outcomes

The types of aerobic training to include are running, cycling, swimming, or similar types of moderate cardio exercise of long duration, at a steady pace, as well as short duration interval and sprint training, enhancing your power potential. Your strength-focused weight training may include conventional free weights, machines, or even weightlifting movements. Power-based plyometric exercises are also important for individuals wanting to develop explosive strength and speed. With weight training, it is important to develop basic muscular strength first, before building up to heavy weights in order to avoid injury. Low-intensity weight training can be used to improve muscle contraction efficiency. This involves doing multiple repeats with relatively light weights (30 – 40% of maximum). You do have the potential to progress to high-intensity weight training; a low number of repeats with relatively heavy weights (60 – 70% of maximum). As someone who has mixed endurance and power potential, we recommend a range of activities that include endurance efforts at Zones 1 - 3 of the Cardio Zones Training Table as well as speed and interval training at levels 4 and 5. Your core sessions should be moderate-duration interval sessions at levels 3 and 4.

Muscle cramping susceptibility

Muscle cramps are sudden, involuntary contractions that occur in various muscles. A sudden, sharp pain, lasting from a few seconds to 15 minutes, is the most common symptom of a muscle cramp. In some cases, a bulging lump of muscle tissue beneath the skin can accompany a cramp. Muscle cramps have several causes. Some cramps result from overuse of your muscles during exercise. Muscle injuries, poor circulation and dehydration can also trigger cramps. Low levels of any of the following minerals that contribute to healthy muscle function may also cause muscle cramps: calcium, potassium, sodium, or magnesium.

Your results

Since you carry the A variant, you are more likely to suffer from muscle cramps.

Risk

TYPICAL ELEVATED

Outcomes

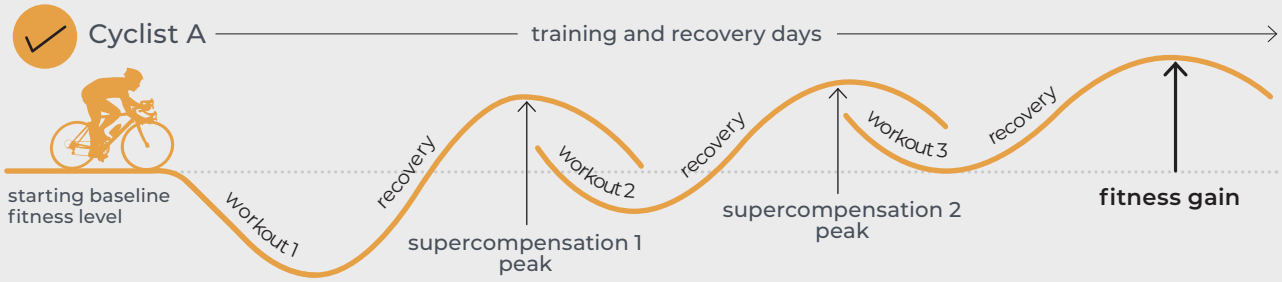
Take proactive steps to avoid cramping. Warm-up sufficiently and stretch before exercising. In general, lower caffeine intake, stay hydrated, and increase calcium, potassium and magnesium intake.

GENE VARIATION	GENE RESULT	GENE IMPACT
AMPD1 G>A	AG	○○

Recovery from exercise

There are limits to how much stress the body can tolerate before it breaks down and risks injury. Doing too much work, too quickly will result in injury or muscle damage, but doing too little, too slowly will not result in any improvement. Building recovery time into any training program is important to let the body adapt to the stress of exercise. Recovery also allows the body to replenish energy stores and repair damaged tissues. When you go for a run, lift weights, or play football, any discomfort tells the body that it needs to be better equipped to deal with the situation. The response: it becomes stronger, bigger, or more efficient – this is called supercompensation and it is why we exercise.

Proper training: supercompensation



Incorrect training

This process is natural and normal, but it is easy to disrupt it with too much exercise. The ability to sustain many intense training sessions comes from a mixture of good genetics and slowly building a training foundation over the course of many years. If you have already been training at a high level for some years, take this as an indication that your body can theoretically handle high loads of exercise under ideal conditions. Otherwise, it is suggested that you build up to this level slowly.

Your results

Your genotype shows that you are likely to recover at a slow rate from hard exercise.

Recovery

TYPICAL SLOW

GENE VARIATION	GENE RESULT	GENE IMPACT
IL-6 -174 G>C	CC	○○○
IL-6R A>C	CC	○○○
CRP G>A	GG	○○○
TNFA -308 G>A	GG	○
MnSOD/SOD2 47 T>C (Val16Ala)	CC	○○○
eNOS 894 G>T	GG	○

Outcomes

It is important to progress your training at an appropriate rate and provide sufficient recovery time in order to be ready for your next training session. You should follow planned recovery strategies to gain the best returns from your training and optimise performance. Sleep is vitally important for recovery and you should look to obtain enough sleep so that you feel refreshed upon rising in the morning. Managing your nutrition is also important for optimal recovery. Because inflammation and oxidative stress influence recovery rates, you should look to consume mostly anti-inflammatory and anti-oxidant foods in your diet and avoid those that are pro-inflammatory. Focus on fruits and vegetables of many different colours; green leafy vegetables and cruciferous vegetables have particularly good anti-oxidant properties. Include fish in your diet; ensure that you are meeting adequate levels of omega-3 intake or you may wish to consider supplementation. Consuming carbohydrate based beverages during prolonged exhaustive exercise can help to reduce levels of inflammatory cytokines such as IL-6 and CRP following exercise. Consumption of a mixed protein and low GI carbohydrate meal after exercise is also known to decrease inflammation and assist recovery. Long term, regular, light and moderate intensity exercise leads to an increase in function of anti-oxidant enzymes, as well as decrease in baseline inflammatory cytokines: beneficial to exercise training, performance and optimal health. Avoid smoking of any kind.

Risk for soft tissue injuries

To optimize performance in sport, athletes must maximize the stiffness of the musculoskeletal system. This stiffness is directly related to the individual's movement economy. In other words, the greater the musculoskeletal stiffness, the better the performance. However, when the tendon is stiffer than the muscle is strong, the protective effect of the tendon is lost and the chance of an injury increases. Genes involved in the structural integrity and remodelling of soft tissues such as tendons and ligaments can be implicated in the risk of injury. These soft tissues are made up predominantly of collagen which has many important functions in the body, including providing your skin with structure and strengthening your bones. Collagen also helps maintain the integrity of your cartilage, which is the rubber-like tissue that protects your joints.

Your results

You are at high risk of developing a soft tissue injury and need to be taking preventative steps against potential injuries.

Injury risk

TYPICAL ELEVATED

Outcomes

Resistance, weight, and flexibility training can assist with injury prevention and rehabilitation if an injury does occur. Ensure adequate intake of vitamin C, iron, and protein as these are necessary for collagen turnover. Consuming bone broth or supplementing with hydrolyzed collagen will also help.

GENE VARIATION	GENE RESULT	GENE IMPACT
COL1A1 1546 G>T	GG	○○○
GDF5 C>T	TT	○○○
COL5A1 C>T		○○

Appendix

Factsheets

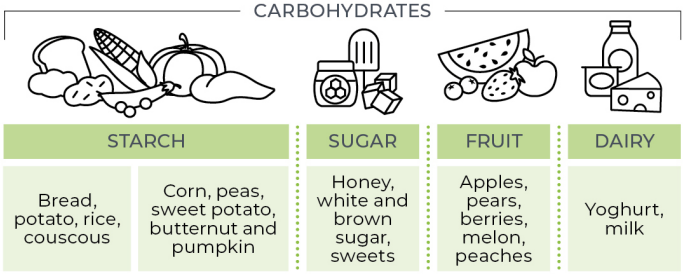
- Diet type for weight management
- Exercise and MET hours for weight management
- Improving sports performance

Diet type for weight management
Low carbohydrate diet

Low carbohydrate diets have a positive impact on obesity, serum lipids, impaired glucose metabolism and hypertension, but it is important to understand what constitutes a low carbohydrate diet. There is no need to completely cut out carbohydrates from the diet; the same positive results can still be achieved with a smaller intake of carbohydrates as described in the recommendations below.

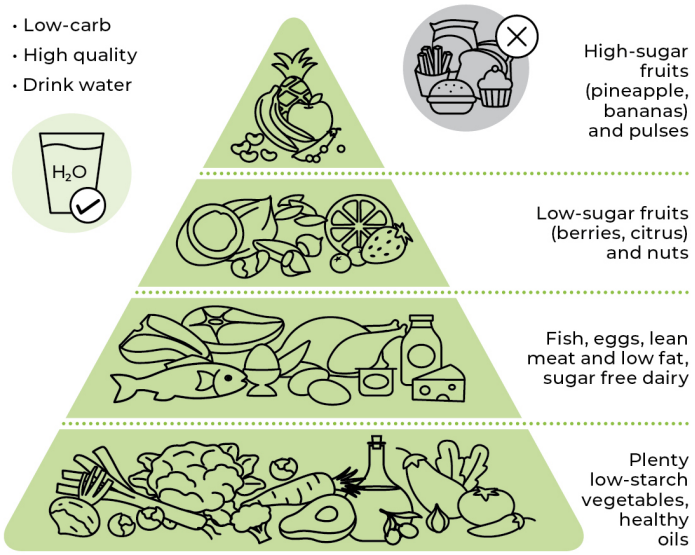
A low carbohydrate diet limits intake to 30-130g of carbohydrates per day that are unrefined and of good quality, usually starting with the lower level in the first week or two, increasing to 60-70g/day by week three, eventually maintaining approximately 100-130g/day.

WHAT IS A CARBOHYDRATE?



FOOD GUIDE PYRAMID

- Low-carb
- High quality
- Drink water



THE DIET IS BEST DESCRIBED AS:

- Refined carbohydrates, most whole-grains and all sugars should be avoided, including natural sugars.
- Carbohydrates will be consumed in an array of vegetables and fruits, legumes, seeds and nuts, and dairy. All these foods do contain a certain amount of carbohydrates and need to be accounted for in your diet plan.
- Avoid starchy vegetables as they are high in carbohydrates and include leafy green vegetables where possible. Fruit will also be restricted.
- Fat intake should focus on mono-unsaturated fatty acids, mostly from olive oil, and Omega-3 polyunsaturated fat-rich foods such as fatty fish.
- Eat 3 meals and 2 snacks a day - never skip meals.
- Avoid drinks and foods with artificial sweeteners, and ensure adequate intake of water.
- Learn to read food labels. Most food contains carbohydrates and you need to learn to identify foods that contain hidden carbohydrates, especially sugar. As an example, tomato sauce and salad dressing are both very high in sugar.

Exercise and MET hours for weight management

Below you will find a detailed explanation of exactly what MET HOURS are, and a guide to plan your exercise week to meet your recommended MET HOURS. Remember to consult your healthcare practitioner before embarking on a new exercise programme, and to stop exercising if you feel nauseous or short of breath.

What is a MET?

MET stands for Metabolic Equivalent Task. METs are a **way to measure how much energy you burn up during any chosen physical activity**. Every activity, from watching TV to going for a run, has a MET value. The more vigorous the activity, the higher the MET value.

What are MET HOURS?

Whereas METs are a way to measure the intensity of a particular activity, MET HOURS **allow you to calculate how many hours of your chosen activities you need to do** in a week.

Three easy steps to calculating your weekly MET HOURS score

Refer to your exercise requirements, and to the table of activities divided into light, moderate and vigorous intensity on page 17.

1. **Match your activity of choice to the exercise description** to determine whether you are reaching your recommended amount of physical activity in MET HOURS. Try to balance high intensity sessions with light to moderate exercises to assist with recovery and decrease risk of injury and 'burning out'.

2. **Use this equation to calculate the MET HOURS for each activity:**

MET VALUE x DURATION = MET HOURS SCORE (in hours)

For example, if you play singles tennis for 1 hour and 40 minutes (1.60 hours):
8 METS x 1.60 = 13 MET HOURS

3. **To calculate your weekly MET HOURS SCORE:**

Add the MET HOURS SCORE of each workout for that week

For example, if you played singles tennis for 1 hour and 40 minutes, ran for 30 minutes at a pace of 8 km/hour (8 x 0.5 = 4) and played 2 hours of golf (4.5 x 2 = 9), then your weekly MET HOURS SCORE will be 26 (13 + 4 + 9)

Table of activities:

Exercise intensity for 1 hour of exercise:

LESS THAN 5 METS

EXERCISE DESCRIPTION	METS
Walking, 3.2km/hr, firm, flat ground	2.5
Cycling, less than 16km/hr, for leisure	3.4
Walking, 5.6km/hr, brisk pace, firm surface	3.8
Rowing, stationary, 50 watts, light effort	4
Tai Chi	4
Water aerobics	4
Golf	4.5

5-9 METS

EXERCISE DESCRIPTION	METS
Cycling, stationary, 100 watts, light effort	5.5
Boxing, punching bag	6
Walking, 5.6km/hr, uphill	6
Cycling, stationary, 150 watts	7
Aerobics, high impact	7
Swimming, freestyle, moderate	7
Circuit training	8
Running, 8km/hr	8
Tennis, singles	8
Mountain biking	8.5
Stationary rowing, 150 watts	8.5

9 METS AND ABOVE

EXERCISE DESCRIPTION	METS
Stairmaster	9
Cycling, 22-26km/hr, vigorous	10
Running, 9.6km/hr	10
Swimming, treading water, fast	10
Stationary rowing, 200 watts, very vigorous	12
Rope jumping, fast	12
Squash	12

Talking during exercise is a reliable way to measure your exercise intensity:

- If you can talk without puffing at all, you're not pushing too hard and it's very likely a **light intensity** activity.
- If you can talk but not sing, you're exercising at a **moderate intensity**.
- If you can't talk without gasping, then you are exercising at a **high intensity**.

Improving sports performance

Cardio zone training table

If you are training with a heart rate monitor, use it to stay within range of the suggested heart rate percentages.

Calculating your target heart rate:

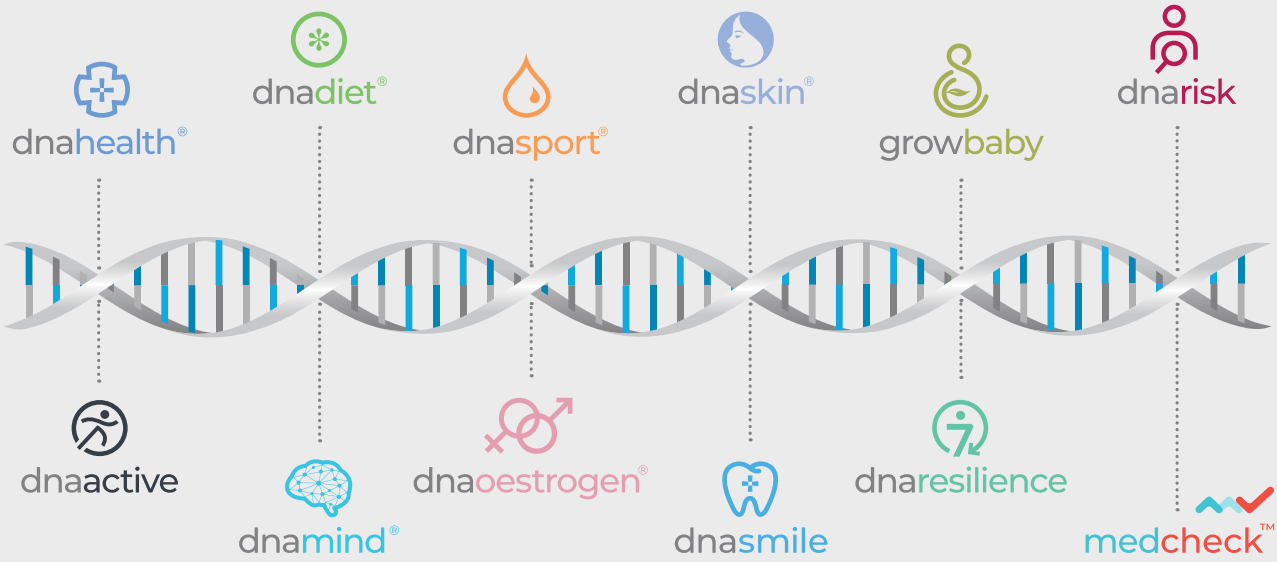
- Maximum heart rate = 220 – age
- Heart rate reserve = maximum heart rate – resting heart rate
- Target heart rate = (heart rate reserve x training %/100) + resting heart rate

If you are not training with a heart rate monitor, choose which zone you think you are in by assessing how you feel during the workout. Does it seem quite light and can you keep a conversation going? Or are you gasping for air throughout the entire session?

ZONE	HEART RATE (target heart rate)	EFFORT / FEEL	BENEFITS
1	**95 - 114** (50 - 60%)	**Very light**	**Improved overall health:** body fat decreases, blood pressure and cholesterol are lowered, muscle mass increase, and helps recovery.
2	**114 - 133** (60 - 70%)	**Light**	**Improved basic endurance:** gain muscle and lose fat mass, strengthen heart muscle, fat utilization zone.
3	**133 - 152** (70 - 80%)	**Moderate**	**Improved aerobic fitness:** increase in the number and size of blood vessels, increased lung capacity and respiratory rate, as well as an increase in size and strength of the heart muscle.
4	**152 – 171** (80 - 90%)	**Hard**	**Increased maximum performance capacity:** high total calories burned during exercise. Large amount of carbohydrates used for energy production. Improved lung capacity and higher tolerance for more strenuous exercises.
5	**171 – 190** (90 - 100%)	**Very hard**	**Develops maximum performance and speed:** Highest total calories burned, but lowest percentage of fat calories. Spending too much time in this zone, even for elite athletes can be painful, cause injuries and lead to over training.

A lifetime of optimal health awaits you

Your genes do not change, which means our laboratories will only ever need one sample* from you. Throughout your life, as your health goals and priorities change, we can continue to provide valuable health insights from this single sample* to support your unique health journey.



Requires finger prick blood spot sample collection

Our Commitment

DNAlysis Biotechnology is continuously developing new tests with the highest standards of scientific rigour. Our commitment to ensuring the ethical and appropriate use of genetic tests in practice means that gene variants are only included in panels once there is sound motivation for their clinical utility and their impact on health outcomes.

ADVANCED technology | ACTIONABLE interventions | APPROPRIATE use in practice

From the laboratories of:

DNALYSIS Biotechnology

Distributed by:

dnalife®

Nordic Laboratories®

info@dnalife.healthcare | www.dnalife.healthcare

For more information:
011 268 0268 | admin@dnalysis.co.za | www.dnalysis.co.za

Approved by:
Michelé Delport - Medical Scientist
Danny Meyersfeld (PhD) - Laboratory Director

Denmark Office: Nygade 6, 3.sal · 1164 Copenhagen K · Denmark | **T:** +45 33 75 10 00
South Africa Office: North Block · Thrupps Centre · 204 Oxford Rd · Illovo 2196 · South Africa | **T:** +27 (0) 11 268 0268
UK Office: 11 Old Factory Buildings · Battenhurst Road · Stonegate · E. Sussex · TN5 7DU · UK | **T:** +44 (0) 1580 201 687

Risks and Limitations:
DNAlysis Biotechnology has a laboratory with standard and effective procedures in place for handling samples and effective protocols in place to protect against technical and operational problems. However as with all laboratories, laboratory error can occur; examples include, but are not limited to, sample or DNA mislabelling or contamination, failure to obtain an interpretable report, or other operational laboratory errors. Occasionally due to circumstances beyond DNAlysis Biotechnology's control it may not be possible to obtain SNP specific results.