dna diet

optimal diet for life

Welcome

to your dna diet report

Date of Birth:	Date Reported:	Sample Number:
Referring Practitioner:		

Background to the analysis

DNAlysis received your swab sample and used special molecular techniques to amplify your DNA for further analysis. This process, called the Polymerase Chain Reaction (PCR), copies the DNA of your genes many times over, so that we can generate sufficient quantities to analyse your genetic material. We then identify unique DNA sequences in some of your genes. Certain changes (polymorphisms) in these genes have been studied in detail, and evidence has emerged that correlates these polymorphisms with an individual's weight management and response to diet and exercise intervention. Having identified the presence or absence of these polymorphisms, we are able, qualitatively, to assess particular areas of intervention for improved weight management related to the specific genes. To make a holistic assessment of weight management, environmental factors (diet and lifestyle) and previous medical and weight history need to be considered in conjunction with the accompanying genetic profile.

We therefore strongly recommend that these results be discussed with an accredited DNAlysis health professional.

In the following pages you will find a table of your genetic results, and an explanation of these results and associated impacts including diet and lifestyle recommendations.

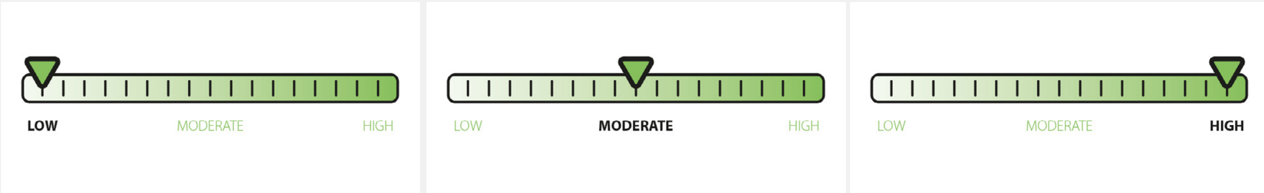
How to read this report

This genetic report contains two primary pieces of information:

Based on our analysis of your genes we have calculated your score to determine which of three possible diet plans (low fat, low carb and Mediterranean) is likely to be the most effective for you.

Once you have established the optimal diet type, there is scope for further personalisation by considering the genetic contribution of relevant diet and lifestyle factors.

We consider the following diet and lifestyle factors that contribute toward weight management: obesity risk, eating behaviour (snacking) and taste preferences, responsiveness to saturated fat and poly-unsaturated fat, and carbohydrate intake, as well as amount and intensity of the importance of mono-unsaturated fat intake and exercise. The significance of each of these is illustrated graphically, as below:



In crafting the ideal diet type take particular note of the lifestyle categories showing moderate or high priority.

Summary of your personalised weight management plan

Your diet plan

Based on our analysis of your genes, we recommend a MEDITERRANEAN DIET plan as the best possible diet for you to manage your weight.

Your exercise plan

A MODERATE to HIGH INTENSITY exercise program that includes 20 MET HOURS a week

Genetic results

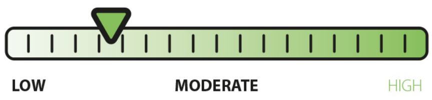
Area of Activity	Gene Name	Genetic Variation	Your Result	Gene Impact
Absorption and metabolism	FABP2	Ala54Thr	GG	
Metabolism	PPARG	Pro12Ala	CC	
	ADIPOQ	-11391 G>A	GG	
	ADRB2	Arg16Gly	AG	
	APOA5	1131 T>C	TT	
Energy homeostasis	UCP1	-3826 A>G	GA	
	UCP2	-866 G>A	GA	
	UCP3	55 C>T	CC	
Carbohydrate Responsiveness	ADRB2	Gln27Glu	CG	
	TAS1R2	Ile191Val	AA	
	DRD2	rs1800497	TC	
	SLC2A2	Thr110Ile	CC	
Fat metabolism, obesity and satiety	APOA2	265 T>C	CC	
Regulation of metabolism and feeding behaviour	MC4R	V103I	TT	
Regulation of energy intake	FTO	rs9939609	AA	
	TCF7L2	rs7903146	CC	
Exercise responsiveness	ADBR3	Trp64Arg	TT	
Circadian rhythms	CLOCK	3111 T>C	TT	
Fat storage	PLIN	11482 G>A	GG	
Inflammation	TNFA	-308 G>A	AG	

No impact: Low impact Moderate impact High impact

Weight management priorities

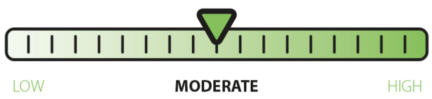
The below diet and lifestyle variables have been analysed for the role they play in your weight management. Based on your recommended diet plan according to your genetic variation, and the contribution of the weight management variables below, you will be able to customize a weight loss programme best suited to your needs. The graphs below give an indication of the significance of each diet and lifestyle variable. From this you will be able to see which factors need the most attention.

Obesity Risk



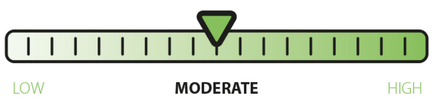
Obesity risk is largely genetically determined. It gives some indication of an individual's responsiveness to a calorie restricted diet, as well as one's ability to manage weight.
Based on your gene results there should be a relatively low barrier to you losing weight, and you should be able to maintain your weight loss when following the right diet plan combined with adequate exercise.

Carbohydrate



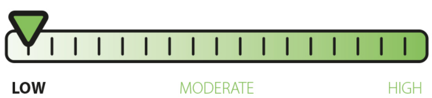
Certain gene variants are associated with weight loss resistance when there is a high dietary intake of carbohydrates.
According to your gene results, you scored in the moderate priority range for carbohydrate responsiveness. By managing the amount of carbohydrate in your diet, you will improve your weight loss outcomes and prevent weight regain.

Saturated Fat



Certain gene variations have been associated with increased obesity risk and slower weight loss outcomes when there is a high saturated fat intake.
According to your gene results, decreasing saturated fat intake is a moderate priority for you, meaning that a high intake of saturated fat may possibly lead to slower weight loss outcomes.

Mono-unsaturated Fat

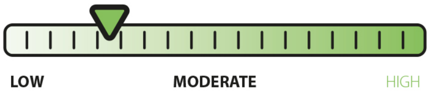


Genetic variants in certain genes have been associated with a lower body weight when there is a higher intake of mono-unsaturated fats in the diet (approximately >13% of total calories).
According to your genetic results this is a low priority for you, and standard guidelines for mono-unsaturated fat intake are recommended.

Poly-unsaturated Fat

Genetic variants in certain genes, including PPARG, have been associated with a lower body weight in individuals when there is a higher intake of poly-unsaturated fats (PUFAs) in the diet, with a focus on omega 3 fatty acids.
According to your genetic variation related to responsiveness to PUFA intake. This is a moderate priority for you, and you may have a beneficial response with weight management when there is a higher ratio of PUFA:SFA in the diet. Replace a majority of your saturated fat intake with PUFAs.

Exercise



Exercise is an important part of weight loss, but some individuals require higher exercise intensities and greater time spent exercising to mobilize their fat stores. You require slightly higher amounts of physical activity to help achieve and maintain weight loss. Try aim for a minimum of 20 MET Hours per week

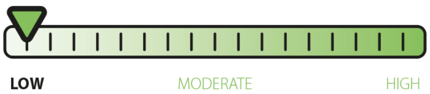
Sweet Tooth

Having a "sweet tooth" can be described as craving, or seeking out, sweet foods. This has been linked to an increased risk for obesity. Certain genes play a role in determining an individual's predisposition to having a sweet tooth.
Your genotype combination influences your ability to taste sweet foods, and may moderately contribute toward you having a "sweet tooth". It is important to try to avoid all high-sugar foods.

Satiety and Snacking

Satiety can be described as the feeling of fullness after a meal. Some individuals have an increased tendency to snack more often due to reduced feelings of satiety.
Based on the genes analysed there is some predisposition for heightened snacking behaviour and reduced feelings of satiety; try not to skip meals, opt for healthy snacks such as vegetables, and make use of mindful eating techniques.

Circadian Rhythms



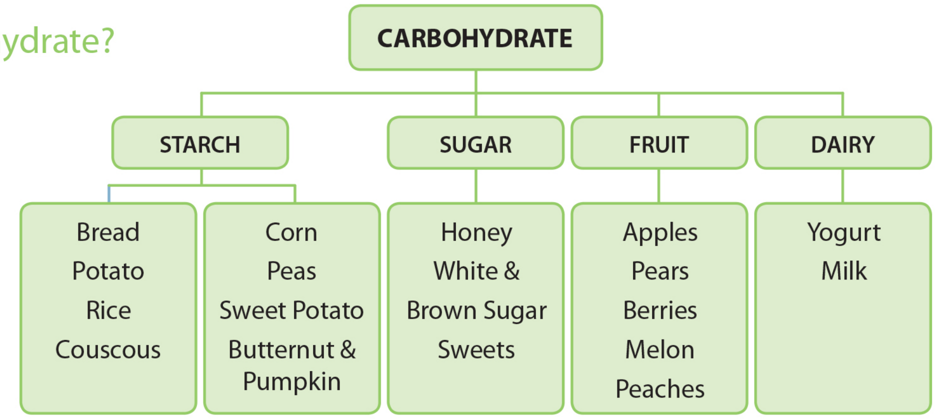
Sleep reduction, changes in ghrelin values, alterations of eating behaviours and evening preference may have a negative effect on weight management. The CLOCK gene plays an important role in regulating an individual's day-night cycle and influences evening preference.
Your genotype is not associated with an evening preference and this is therefore a low priority area for you.

Diet plan principles

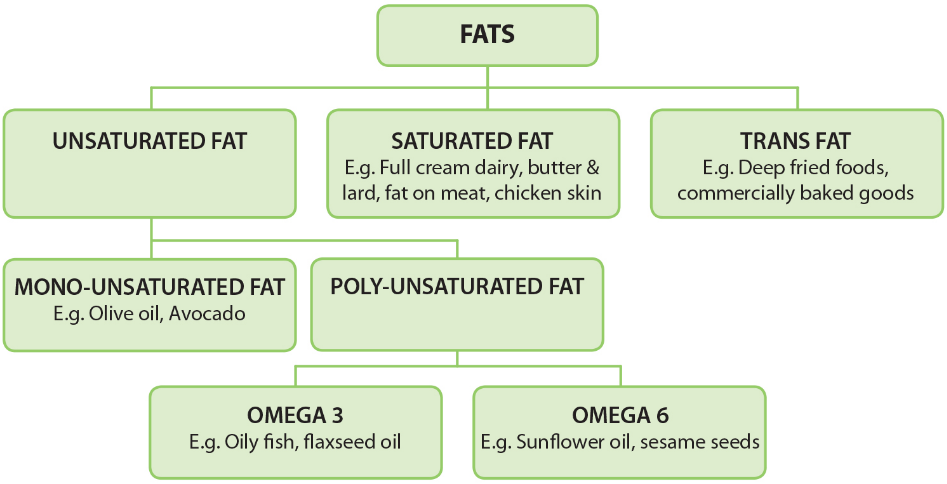
Mediterranean Diet

The Mediterranean food patterns are typical of Crete, Greece and Southern Italy in the early 1960's. The term is closely tied to traditional areas of olive cultivation in the Mediterranean region more then 30 years ago, and not to the urbanized diet eaten in these coutries today. Several studies have established the health benefits of the mediterranean diet in reducing the risk if metabolic syndrome, type 2 diabetes, cardiovascular disease, and some neuro-degenerative diseases and cancers. In addition, it has been shown to be an extremely effective eating plan for weight loss.

What is a carbohydrate?



What is a fat?



The diet is best described as:

- Rich in plant foods (whole-grain cereals, fruits, vegetables, legumes, tree nuts, seeds and olives)
- Extra virgin olive oil is the principle source of added fat
- High to moderate intakes of fish and seafood
- Moderate consumption of eggs, poultry and low fat dairy products (mainly cheese and yoghurt)
- Low consumption of red meat
- Moderate intake of alcohol (mainly wine during meals)
- In addition all foods in this plan shoud be as fresh as possible, minimally processed, and local and seasonal foodstuff should be used.

Your exercise plan

By now you will know the amount of exercise we recommend you do a week to maximise your chance of weight loss. This recommendation would have been given as MET HOURS. 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 physician 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.

3 EASY STEPS TO CALCULATING YOUR WEEKLY MET HOURS SCORE

1. Below is a list of activities divided into light, moderate and vigorous intensity.
   Find the activity closest to yours.
2. Use this equation to calculate the MET HOURS for each activity.

   MET Value X Duration (in hours) = MET HOURS score

   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 .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). See how this compares to the MET HOURS recommendations in your report.

Below is a list of MET VALUES, divided into light, moderate and vigorous intensity activities. 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.

LIGHT INTENSITY	LESS THAN 5 METS
Stretching, Hatha yoga	2.5
Horse riding	2.5
Walking, less than 3.2km/hr, flat ground	2
Walking, 3.2km/hr, firm, flat ground	2.5
Walking, 4km/hr, downhill	2.8
Cycling, less than 16km/hr, for leisure	3.4
Rowing, stationary, 50 watts, light effort	4
Tai chi	4
Walking, 5.6km/hr, brisk pace, firm surface	3.8
Water aerobics	4
Golf	4.5
Badminton	4.5

MODERATE INTENSITY	5 - 9 METS
Cycling, stationary, 100 watts, light effort	5.5
Weight lifting, vigorous effort	6
Jogging/walking combination, less than 10 minutes	6
Boxing, punching bag	6
Hiking, cross-country	6
Walking, 5.6km/hr, uphill	6
Mountain biking	8.5
Cycling, general	8
Cycling, stationary, 150 watts	7
Circuit training	8
Stationary rowing, 150 watts	8.5
Aerobics, high impact	7
Running, 8km/hr	8
Cross country running	8
Hockey	8
Tennis, singles	8
Mountain climbing	8
Swimming, freestyle, moderate	7
Walking, 8km/hr	8

HIGH INTENSITY	9 AND ABOVE METS
Cycling, 22-26km/hr, vigorous	10
Running, 9.6km/hr	10
Running, 12.8km/hr	13.5
Kickboxing, judo, etc	10
Rollerblading	12
Cycling, ≥32km/hr	16
Stairmaster	9
Stationary rowing, 200 watts, very vigorous	12
Boxing, sparring	9
Soccer, competitive	9
Orienteering	9
Rope jumping, fast	12
Squash	12
Swimming, butterfly	11
Swimming, treading water, fast	10

Gene explanations

Below follows an explanation of all the genes analysed in this test. Pay particular attention to those genes where you received moderate or high impact scores in the gene table on page 4.

ADRB2 Arg16Gly

This ADRB2 receptor protein is involved in the mobilisation of fat from fat cells for energy in response to catecholamines, and modulates lipolysis during exercise. The G allele has been associated with obesity, and G allele carriers are more likely to gain and regain weight and lose weight more slowly. These carriers are less able to mobilize fat stores in response to exercise. In these individuals it is important to emphasize diet for weight management as exercise may be less effective.

ADRB2 Gln27Glu

The G allele has been associated with increased BMI and fat mass. Subjects with these genotypes are less able to mobilise fat stores for energy and have been shown to have a greater risk of obesity and elevated insulin levels when CHO intake is greater than 49% . Decreasing intake of CHO has been shown to reduce insulin levels and is beneficial in weight management.

ADRB3 Trp64Arg

The C allele is associated with increased BMI and weight loss resistance. These individuals do not break down abdominal fat in response to exercise. As a result they may have a slower energy metabolism and are less responsive to the beneficial effects of exercise for weight management. The higher risk of obesity among carriers of the C allele may be diminished by higher levels of vigorous physical activity.

ADIPOQ -11391 G>A

ADIPOQ encodes adiponectin, which is expressed in adipose tissue. Adiponectin is a protein hormone that modulates a number of metabolic processes, including glucose regulation and fatty acid oxidation. Obese subjects tend to have lower circulating levels of adiponectin. Individuals with the A allele tend to have higher levels of adiponectin and have been associated with improved obesity parameters. A allele carriers who consumed a diet that comprised more than 13% of total energy from mono-unsaturated fats had a lower BMI. Generally, G allele carriers have increased risk for obesity. GG genotype individuals better manage weight on a calories restricted diet. Continues follow-up and support is also required.

APOA2 T>C

Apolipoprotein A2 (APOA2), the second most abundant apolipoprotein in HDL, plays a complex and relatively undefined role in lipoprotein metabolism, insulin resistance, obesity and atherosclerosis susceptibility. The CC genotype is associated with obesity and increased food consumption, especially total fat and saturated fat intake. When saturated fat intake is high the CC genotype is strongly associated with increased BMI and obesity. This diet-gene interaction may also play a role in insulin resistance (IR)

APOA5

APOA5 interactions has been previously demonstrated for triglyceride metabolism as well as interactions with BMI. The T allele has been associated with greater weight, less weight loss, especially when on a high fat, high saturated fat diet.

ADRB3

The beta-3 adrenergic receptor (ADRB3) protein is expressed primarily in visceral adipose tissue where it is involved in the regulation of lipolysis. The C allele is associated with increased BMI and weight loss resistance. The higher risk of obesity among carriers of the C allele may be diminished by above average levels of vigorous physical activity.

CLOCK

Circadian Locomotor Output Cycles Kaput (CLOCK), an essential element of the human biological clock, is involved in metabolic regulation. Carriers of the C allele are less successful losing weight than the TT genotype. In addition, those with the C allele have reduced sleep, report morning fatigue and show an evening preference for activities, they also have higher ghrelin levels which regulates appetite, potentially altering eating behaviour and weight loss.

DRD2

Midbrain dopamine circuits may play an important role in both addiction and normal eating behaviour as they are involved in reward processing, particularly dopaminergic signaling via dopamine receptor 2 (DRD2).

FABP2

Fatty acid binding protein 2 (FABP2) protein is found in the small intestine epithelial cells where it strongly influences fat absorption and metabolism. The A allele is associated with obesity, elevated BMI, increased abdominal fat, higher leptin levels, insulin resistance, higher insulin levels, and hypertriglyceridemia. A allele carriers have greater fat absorption and tend to have a slower metabolism, leading to a tendency for weight gain, slower weight loss and difficulty in losing abdominal fat.

FTO

Fat-mass-and-obesity-associated (FTO) gene is present at high levels in several metabolically active tissues, including, heart, kidney, and adipose tissue, and is most highly expressed in the brain, particularly in the hypothalamus which is concerned with the regulation of arousal, appetite, temperature, autonomic function, and endocrine systems. It has been suggested that the FTO gene plays a role in appetite regulation and that it is associated with energy expenditure, energy intake, and diminished satiety. The A allele has been associated with higher BMI, body fat percentage and waist circumference, especially in individuals with a sedentary lifestyle and a high fat intake. Modify the diet to include a moderate amount of carbohydrate, increase MUFA and decrease SAT FAT, and manage the total fat intake. Regular physical activity is recommended.

MC4R

MC4R is a strong obesity candidate gene significantly associated with energy intake and expenditure. The C allele is associated with higher intakes of total energy and dietary fat, as well as greater snacking in children and adults, greater hunger and a higher prevalence of eating large amounts of food.

PLIN

The allele is associated with greater obesity risk. A allele carriers are more weight loss resistant and show greater decrease in lipid oxidation rate than GG. When there is a higher intake of complex CHO, the allele is protective against obesity. Avoid all refined CHO.

PPARG

This protein is abundantly expressed in fat cells. It is a transcription factor activated by fatty acids and plays an important role in the expression of adipocyte-specific genes. The CG and GG genotype is associated with increased risk for obesity, especially when exposed to an obesogenic environment. A sedentary lifestyle also contributes toward obesity risk in G allele carriers. To better manage weight, increase physical activity levels and implement a calorie restricted, controlled eating plan.

SLC2A2

GLUT2, coded by the SLC2A2 gene, is a member of the facilitative glucose transport protein (GLUT) family and is expressed in the pancreas, liver, small intestine, kidney, and brain. GLUT2 facilitates the first step in glucose induced insulin secretion, with the entry of glucose into the pancreatic βcell. Because of its low affinity for glucose, it has been suggested as a glucose sensor, is considered to be important in the postprandial state, and is involved in food intake and regulation.

TAS1R2

The diverse tissue distribution of TAS1R2 gene affects food intake beyond the detection of sweet taste on the tongue and palate. These tissues include the gastrointestinal tract, pancreas and hypothalamus, tissues known for regulating metabolic and energy homeostasis

TCF7L2

Transcription factor 7-like 2 (TCF7L2 gene encodes a transcription factor that regulates blood glucose homeostasis and may operate via impaired glucagon-like peptide 1 secretion, which is stimulated more by fat than by carbohydrate ingestion. Individuals with the T allele, and more so the TT genotype, experience less weight loss than CC genotype. Diet and exercise intervention is very important for T allele carriers to prevent weight regain and development of IR and diabetes. T allele carriers lose more weight on a low fat hypo-energetic diet than a high fat diet. A low GL diet and all interventions to manage insulin is also recommended.

TNFA -308 G>A

Tumour necrosis factor-α (TNF α), a proinflammatory cytokine secreted by immune cell and fat cells and has been implicated in the development of obesity and insulin resistance. The A allele increases TNFα production and is associated with increased obesity risk especially when dietary fat intake is high. Weight management is imperative in managing inflammation.

Uncoupling Proteins

The uncoupling proteins 1, 2 and 3 belong to the family of mitochondrial transporter proteins that allow protons to re-enter the mitochondrial matrix without phosphorylating ADP (adenosine diphosphate), thus uncoupling the connection between oxidative metabolism and energy production, releasing energy as heat. The uncoupling proteins may therefore play an important role in energy homeostasis. These proteins share structural similarities, but are expressed in different tissues.

UCP1 -3826 A>G

Due to the possible weight loss resistance that G allele individuals may face, it is important to set realist weight management goals, and focus on interventions that will improve the individual's ability to burn fat. Include more high intensity exercise, or interval training, in the weight management plan. Regular follow up and practitioner support will also help to improve weight management outcomes.

UCP2 -866 G>A

The A allele may offer protection against a higher BMI. It has been shown that by following a hypocaloric diet, UCP2 and UCP3 expression can be significantly increased in adipose and skeletal muscle cells. G allele carriers would therefore benefit from restricting total energy intake, long-term, and engaging in regular physical activity.

UCP3 55 C>T

The T allele offers protection against a higher BMI. It has been shown that by following a hypocaloric diet, UCP2 and UCP3 expression can be significantly increased in adipose and skeletal muscle cells. C allele carriers would therefore benefit from restricting total energy intake.

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Notes for practitioners

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