



Optimal Health Pro Report

Created for: Demo 12

Date: 13/09/2019

Practitioner: Demo Partner



Demo 12

Age	50	Sex	M
Height	185.42 cm	Weight	110 kg
BMI	32.1	Exercise	Never
Smoke		Alcohol	Moderate

In order to prepare this report, myDNAhealth has analysed your DNA along with the answers you provided in the questionnaires. This combined approach highlights genetic and lifestyle risk factors which may impact your gene expression, in other words, whether the risk potential is being realised through your diet and lifestyle choices. As you read through your results, please remember that your genes are just your tendency and not your health destiny. Nutritional and lifestyle changes are what make the crucial difference.

Please also be aware that **this report does not diagnose any health conditions or provide medical advice**. Consult with a healthcare or nutritional professional before making any major dietary changes or if you have any other concerns about your results.

How to read your report

In the sections that follow, we have listed potential risk areas where you need to be fairly vigilant when it comes to lifestyle choices. You will see three possible risk scores **Typical**, **Moderate** or **Elevated**. Remember, your genes are merely the potential you have and may not be expressing themselves all the time. It is best to adopt healthy eating and exercise habits that will support your overall risk potential.

Everyone has some potential genetic risks, however, whether they are expressing or not is the true determining factor as to whether they need continued support or not. Don't treat the individual genetic variants, rather support yourself holistically using sleep, stress management, exercise and good nutrition from a range of healthy foods for overall health. If you think you may need some extra support from supplements, please remember to always consult a nutrition or healthcare practitioner, who will assess your overall risk alongside your DNA results and will be able to provide you with the qualified, expert advice.

We are very happy that you joined myDNAhealth and we trust that you benefit greatly.

Yours sincerely,
myDNAhealth Clinician Team



Legend



Typical



Moderate



Elevated

APOE Genotypes



Cholesterol Lowering
Foods Response



Stress



Sleep



Burnout



Appetite Regulation



Propensity to Higher BMI



Blood Sugar Balance



Inflammation



Saturated Fat Balance



Cholesterol Insights



Omega 3|6 Balance



Toxicity



Methylation Cycle Balance



Hemochromatosis Risk



Antioxidant Needs



Oestrogen Imbalance



Celiac Risk



Nutritional Requirements and Sensitivities

Lactose Intolerance



Caffeine Metabolism



Vitamin D



Recommended Diet: Reduced Carbohydrate Eating Plan

Recommended Exercise: Aerobic (Cardiovascular)





Sleep - Elevated

Your Result

Your overall score indicates that you may be predisposed to experience poor sleep patterns. To determine the risk score, we have assessed your genetic variants (CLOCK) and sleep questionnaire results.

Your Genetic Variants



Clock

C allele carriers are shown to prefer being more productive in the evenings. This has been associated with shorter sleep duration, more daytime sleepiness and may lead to less physical activity.

The **Circadian Locomotor Output Cycles Kaput** (CLOCK) gene is a key part of our internal body clock. Our 24-hour natural circadian rhythms directly influence our sleep patterns. This includes the amount of sleep we get and our preferences for sleep-wake timings. Morning types or so-called larks, naturally prefer to wake earlier and tend to be more productive in morning, as opposed to evening types, often referred to as owls, who prefer to get things done later in the day and into the evening.



Lifestyle Interventions

What to do

Tips for better sleep

If you do start experiencing interrupted sleep patterns then you may find these tips helpful. What you eat, drink and do can have a huge impact on the quality and pattern of your sleep - and not just in the time before bed. Think of your sleep as just one component in your 24-hour cycle of wake and rest; to get the most out of it you need to control what you eat and drink and when.

The list of suggestions for better sleep is not meant to be implemented in its entirety. Instead pick three or four changes to implement to help improve your sleep quality.

Make sure you are not over-stimulated before bed

- Avoid alcohol (wine, beer, and hard liquor) within 3 hours of bedtime.
 - Avoid caffeine-containing beverages or foods after 2 pm; if sensitive to caffeine, avoid it after 12 noon.
- Read the labels of everything you eat and drink!



- Similarly, aerobic exercise can elevate your alertness for several hours, so you should ideally exercise before 6pm or at least 3 hours before bedtime.
- decongestant cold medicines at night.
- Some medications may have stimulating effects. Consult your pharmacist and doctor to determine whether any of them might be contributing to sleep problems. Do not discontinue them without permission from your doctor.

Sleep planning and preparation

- Plan your sleep by putting it into your schedule; plan for 8½ to 9 hours in bed.
- As much as possible, go to sleep and wake up at the same time each day. This will help train your biological clock.
- Begin prepping for bedtime 30 minutes before getting in bed.
- Avoid getting in bed after 11 pm as late-hour sleep is not as helpful as earlier sleep.
- Avoid late afternoon or evening naps.
- Avoid naps longer than 45 minutes unless you are sick or quite sleep deprived.
- Avoid large meals or spicy foods before bed.
- Finish all eating 3 hours prior to going to sleep. This allows your digestion to get underway and metabolism to return to baseline.

Relax the brain before bed time

- Have a wind-down routine before retiring for the night. Consider stretching, meditation, enjoy a face cleansing ritual before bed and write down any concerns or tasks for the next day on a piece of paper and leave it next to your bed.
- Try a hot salt/soda aromatherapy bath which can help raise your body temperature before sleep to induce sleep. A hot bath also relaxes muscles and reduces tension. For example, add 1-2 cups Epsom salts, ½ to 1 cup baking soda and 10 drops lavender oil.

Bright light / blue light

- Our internal body clock works best if it is reset in the morning by light exposure so get outdoors in the morning.
- Consider reading a good neutral book under low light to help with falling asleep.
- If using a tablet or phone for reading, make sure they are in the night-time setting and brightness is as low as possible. Research shows that the blue light from electronic screens including smart phones and televisions can confuse our natural biological clock leading to a reduction in sleep quantity and quality.

Sleep environment

- Consider where you sleep, including bed/bedding, light, noise and temperature.
- Turn down the light in the bathroom and in rooms you are in 15 minutes before going to bed.
- Decrease the light in your bedroom by using a dimmer or a reading light with a dimmer.

- Turn off or remove any appliances or clocks that make noise.
- Make sure your sleeping area is the correct temperature range (not too hot or too cold).

Bedding and pillows

- Consider replacing your pillows with hypoallergenic pillows. Use ultrafine allergy pillow and mattress covers.
- Sleep on the highest quality bed linens you can afford.

Tension and anxiety

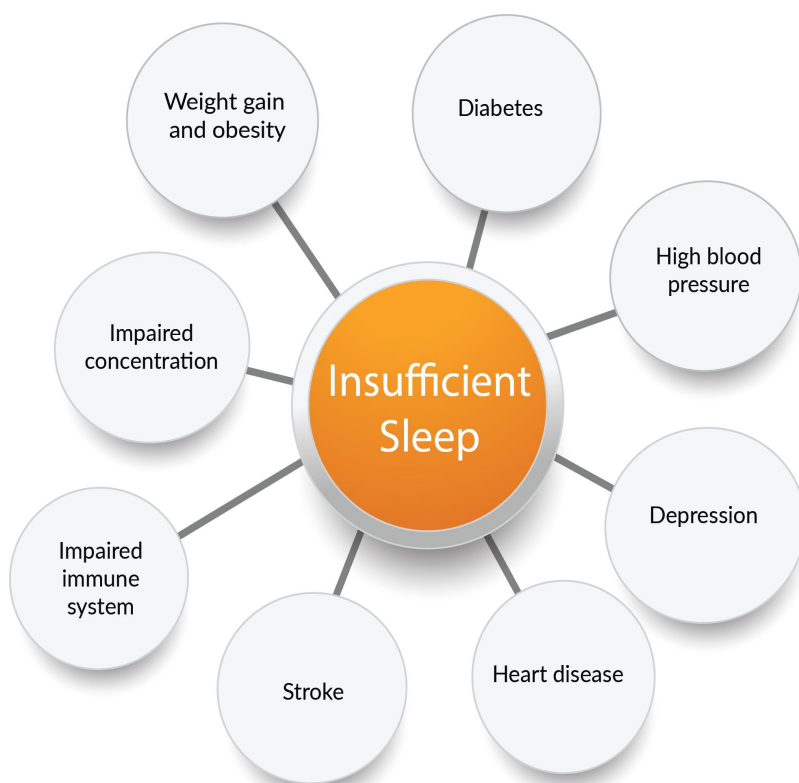
- Avoid anxiety-provoking activities close to bedtime.
- Avoid watching the news before going to bed.
- Avoid reading stimulating, exciting materials in bed.
- Avoid paying bills before bed.
- Avoid checking your financial reports or the stock market before bedtime.
- Try to achieve some action plan or resolution of a discussion or argument before trying to go to sleep.
- Try writing in your journal any disturbing thoughts that are running through your mind.
- Schedule a time within the next few days to deal with whatever is troubling you. If you are having trouble managing your concerns for more than a few weeks, consult your healthcare or nutritional practitioner for treatment suggestions.
- There are many relaxing yoga or stress reducing mindful breathing Apps, CDs or DVDs available to help you find a relaxing bedtime ritual that works for you.

Always seek help from a healthcare or nutritional practitioner if sleep remains disrupted.

More Info

Health problems linked to insufficient sleep

Poor sleeping patterns could lead to major health issues such as obesity, heart disease, high blood pressure and diabetes. Sleep supports healing and detoxification and is an important factor in maintaining healthy hormones. When asleep, we "clear out" neurotransmitters and hormones in the brain to prevent brain fog, fatigue, low mood and anxiety.





Appetite Regulation - Moderate

Your Result

According to the genetic variants as well as the questionnaire you filled in, you have a moderate risk for food cravings which can put you at risk of excessive weight gain.

Your Genetic Variants



Clock

C allele carriers are predisposed to get less sleep which, is linked to weight gain. Specifically, carriers of the C allele may have higher levels of an appetite stimulating hormone, ghrelin leading to greater food intake. Other factors are thought to be important including; delayed breakfast times, increased likelihood of choosing processed foods and less ability to engage with weight loss diets.

Regulation of our appetite is influenced by many factors and we are increasingly aware that our sleeping preferences play important roles in prompting us to eat. The **CLOCK** gene forms part of our genetic internal body clock and variations in this gene have been associated with altered metabolic function and appetite control.



FTO

Carriers of the A allele show some increased propensity for a higher BMI, higher body fat percentage due to an increased appetite particularly for saturated fat. On a more positive note, lifestyle modification is effective in weight management and is not hindered by having this gene variant.

The **Fat Mass and Obesity Associated (FTO) Gene** has a genetic variant which has been consistently associated with appetite regulation, energy expenditure and risk of obesity. FTO is expressed in most tissues but highest levels are found in the hypothalamus, a key brain area involved in energy balance.



MC4R

TT allele shows no change in eating behaviours due to this variant.

Alpha-Melanocyte-stimulating hormone forms a crucial part of our satiety response in the brain by binding to the **melanocortin 4 receptor (MC4R)** to suppress appetite.



Craving
Questionnaire
Typical

Lifestyle Interventions

What you can do

Start by making some lifestyle changes. Get enough sleep, go for a run or brisk walk whenever you get the urge to reach for something sweet (or salty) – and these small, but important changes will help you become healthier and cravings-free.

Improve sleep and mood

Cravings may result from low mood or lack of sleep: it's our body's way to make up for the lack of energy and dopamine. Sleep also regulates the hunger and satiety hormones – ghrelin and leptin. In case of sleep deprivation, there is an abundance of the hunger hormone ghrelin and not enough of the satiety hormone leptin. Sleep also balances other hormones and not getting a good night's sleep can lead to high levels of cortisol – the stress hormone.

Not only that, but when we're sleep deprived, the CB1 receptor of the endocannabinoid system of the brain stimulates reward and addiction mechanisms – that's why that chocolate bar is even more dangerous when you're sleep deprived, it might drag you into a vicious circle.

See Sleep Report for more information.

Reduce stress

When we're stressed, we try to snack ourselves calm. Stress may also cause weight gain on its own, without extra food cravings. Stress results in higher levels of cortisol, the stress hormone, which may promote belly fat. See Stress Report for more information.

Exercise

Benefits of regular exercise are enormous. We often seek sugary treats to boost our mood, but exercise can do that too! Endorphins get released into our bodies after a workout, improving our mood, so we might not need that mood-boosting snack after all.

Eat filling foods

such as whole foods, protein-rich foods and foods containing healthy fats to stay full for longer and avoid the need to snack.

Stay hydrated

Too little water can promote hunger and cravings in some people. Hunger and thirst can produce very similar sensations in the mind, causing it to become confused. One of the easiest ways to reduce food cravings is to make sure the body is hydrated throughout the day. Drinking plenty of water helps clean out toxins from the body, which may also benefit a person's overall well-being.

Avoid feeling hungry

Under-eating can worsen food cravings by making us crave more calorie-dense foods than usual, such as fried

and processed foods. Don't wait for hunger to become too intense, instead, have a regular pattern of meals planned throughout the day.

Control portions

For some people, completely avoiding the food they crave may make these cravings worse. This can lead to overeating or feeling miserable without that food. In this case, it may be better to satisfy the cravings with a small, portion-controlled treat. It can help to put this treat at the end of a healthy habit, such as going for a walk or completing an exercise routine.



Saturated Fat Balance - Elevated

Your Result

Your score indicates that this is an area that needs dietary support in order to reduce risks associated with impaired saturated fat metabolism and changes in blood triglyceride levels. To determine the risk score, we have assessed your genetic variants including APOA2 and APOA5 alongside the dietary fat intake questionnaire to indicate if you may be over consuming certain fats.

Consumption of fats, particularly saturated fat has historically been associated with poor cardiovascular outcomes and obesity. From this, earlier nutritional guidelines regarding dietary fat intake often included generic advice to consume a low-fat diet. However, current research and understanding has advanced to discover that not all fats are created equal and that you may process fats in slightly different ways according to your genetic variations and dietary choices. Saturated fat can be recognised by their characteristic of being solid at room temperature. Examples include, animal fat such as beef, lamb, chicken, pork and dairy products, plus it is also present in some plant foods such as coconut, palm oil and peanuts.



Saturated and Trans
Fats Questionnaire
Severe

Your Genetic Variants



ApoA2

Those who carry two copies (CC) of the APOA2 genetic variant are at increased risk of weight gain particularly visceral adipose tissue (also known as visceral obesity), if they consume a diet high in saturated fats.

The **APOA2 gene** encodes Apolipoprotein A-II, a protein which is an important part of High-Density Lipoprotein (HDL) cholesterol (which is sometimes known as our 'good' cholesterol). A variant in this gene has been associated with reduced ability to produce Apolipoprotein A-II which has effects on saturated fat metabolism.



ApoA5

G allele carriers have been associated as having higher average fasting triglyceride levels. Research has shown benefits of eating a diet containing whole grains and legumes plus reductions of omega 6 intake.

The **APOA5 gene** encodes the Apolipoprotein A5 which is part of our triglyceride (fat) metabolism. A variant in this gene has been associated with changes in blood triglyceride levels related to the diet we choose.

Lifestyle Interventions

What you can do

When balancing your fat intake, it is important to look at all aspects of your diet. Research varies on its opinion as to the best amounts of fat to consume in the diet, but it is generally considered best to keep fat to 20%-35% of your recommended dietary intake unless there is some other specific requirement (such as for weight management, infants, during pregnancy and certain medical conditions – please consult your healthcare provider for further information).

Fat provides a lot of energy in a small volume and can be used by the body for different processes such as a source of energy but is also important for optimal functioning of the brain, connective tissue and gastrointestinal tract. It is best to keep your saturated intake to 8%-10% and to offset this by including daily sources of healthier unsaturated fats found in avocados, olives, nuts, seeds, oily fish and flaxseeds.

Top tips for balancing your total fat intake include:

- Reduce your consumption of meats and dairy produce and choose higher welfare or wild products where possible.
- Regularly include sources of omega 3 beneficial fats. This may be achieved by including oily fish in your diet, aim for a minimum of two portions per week or including flaxseeds such as a salad topper or in porridge.
- Eat olives and walnuts, consider using the oils of these as a salad dressing.

As our fat pathways are linked to our carbohydrate and protein pathways it is important to be mindful of other areas in your diet to ensure optimum fat metabolism. This includes:

- Balancing blood sugars by choosing low glycaemic index and lower sugar foods.
- Choosing foods higher in fibre such as vegetables, oats, barley, beans, lentils and nuts can help to balance blood sugars and aid the elimination of certain fats from the body.
- Including a wide range of phytonutrients and antioxidants found in coloured fruits and vegetables. Aim for a rainbow effect e.g. blueberries, yellow bell peppers, spinach, onions.

How to balance your fat intake

Our understanding of how we should be eating fats in our diet has moved on from simple low-fat guidance. We now understand the importance of paying attention to both quantity and quality of the fats we consume.

Tips for storage and cooking:

Due to their nature fats and oils (particularly unsaturated) are easily degraded by heat and light, becoming rancid and lose their benefits and actually become detrimental for our health.

Follow the following tips to keep your fat and oils in the best condition.

- Oils should be kept in dark glass containers at cool temperatures and used before their sell by date
- Never cook with fats at high temperatures. If you need to fry or roast use a small amount of a stable fat such as coconut oil or ghee at the lowest temperature possible.
- Do not fry or excessively heat monosaturated or polyunsaturated oils. Use these as salad dressings.

- Throw away any fat or oil if it smells rancid.



Cholesterol Insights - Moderate

Your Result

Your score indicates you may be at some risk of an unbalanced cholesterol lipoprotein profile and associated health issues such as cardiovascular disease. If you are at all concerned, contact your healthcare provider for further discussion and testing.

To determine the score, we analysed your genetic variants including PPARG, GCKR, FABP2 and APOA5 alongside the dietary fat intake questionnaire.

Your Genetic Variants



ApoA5

G allele carriers are associated with higher fasting total cholesterol levels and LDL-cholesterol (which is sometimes known as our 'bad' cholesterol) blood levels plus lower HDL-cholesterol (which is sometimes known as our 'good' cholesterol) blood levels. Research has shown benefits of eating a diet containing whole grains and legumes plus reductions of omega 6 intake.

The **APOA5 gene** encodes the Apolipoprotein A5 which is part of our triglyceride (fat) metabolism. A variant in this gene has been associated with changes in cholesterol blood profiles.



FABP2

T allele carriers show a predisposition to higher LDL-cholesterol (which is sometimes known as our 'bad' cholesterol) and lowered HDL-cholesterol (which is sometimes known as our 'good' cholesterol) blood profiles. Research shows that it may be beneficial to moderate saturated fat intake and increase omega 3 intake.

FABP2 gene produces a small protein predominantly found in the intestinal epithelial cells, fatty acid binding protein 2. This protein is important for uptake of fatty acids from the gastrointestinal tract. A variant of this gene has been found to alter the protein structure and increase fat sensitivity, modifying cholesterol blood profiles.



GCKRa

CC allele is not associated with changes in blood triglycerides or cholesterol.



Cholesterol
Lowering
Questionnaire
Moderate



Glucokinase is a key enzyme involved in regulating how the liver either stores glucose as glycogen or uses glucose for energy. **GCKR** is a gene which produces an important regulatory protein for this pathway, helping to control the fate of glucose. Because the way in which we use glucose also influences our blood triglyceride and cholesterol levels a variant of the GCKR gene has been associated with changes in triglyceride and cholesterol levels.



PPARg

CC allele is not associated with changes in cholesterol levels.

PPARG gene encodes a transcription factor, peroxisome proliferator-activated receptor gamma, a type of protein able to enter a cell nucleus and bind to DNA to regulate expression of genes. PPARG is a regulator of metabolism of fats - breakdown and storage - from our adipose tissue. A genetic variant in this gene has been associated with reductions in ability to activate gene expression and associated with changes in cholesterol levels.

Lifestyle Interventions

What to do

We now know that our cholesterol profile is influenced by our genetics, diet and lifestyle. When considering which foods to change, it is important to remember that as little as 10% of our blood cholesterol profile is influenced by the cholesterol we eat.

Top tips for balancing your cholesterol profile include:

Reduce processed (particularly fried) foods and saturated fat consumption See the saturated fat decision tree for further information.

Exercise regularly: aim for at least 150 minutes of moderate aerobic activity such as cycling or brisk walking every week; or 75 minutes of more vigorous exercise such as running or a game of singles tennis every week; or a mix of moderate and vigorous aerobic activity every week – for example, two 30-minute runs plus 30 minutes of brisk walking equates to 150 minutes of moderate aerobic activity.

Add soluble dietary fibre to your diet - To help the removal of excess cholesterol include regular soluble dietary fibre sources such as oats and legumes.

Regularly include sources of omega 3 beneficial fats. This may be achieved by including oily fish in your diet, aim for a minimum of two portions per week or including flaxseeds such as a salad topper or in porridge.

Eat a daily rainbow vegetables and fruits. We are increasingly understanding that the colours of fruits and vegetables contain natural compounds called phytonutrients which can have powerful health benefits. Balanced cholesterol profiles have been associated with consuming a diet rich in fruit and vegetables, particularly of a variety of colours. Certain phytonutrients have been particularly associated with helping to reduce risks

associated with LDL cholesterol.

Aim to include the following as part of your rainbow of plant foods:

- **Lycopene:** is a red-coloured pigment found in foods such as tomatoes, tomato-based products and red watermelon.
- **Phytosterols:** are found in many plant foods but in useful concentrations in nuts (and their oils), olive oil, seeds, whole grains and legumes.
- **Quercetin:** is a strong anti-oxidant found in red onions, buckwheat, red grapes, green tea and apple skins.
- **Resveratrol:** is found in red grapes and becomes highly concentrated in red wine (remember alcohol should be consumed in moderation) but is also found in blueberries and peanuts.

Our cholesterol profile is often associated with guidance for a cardio-protective plan. As part of some wider guidance here are some guidelines for heart health. Please speak to your healthcare provider to assess your heart health and for further guidance and specific medical advice.

Understanding cholesterol

Cholesterol is an essential component of our cell membranes, steroid hormones (such as testosterone or oestrogen), bile acids and vitamin D. As cholesterol is a type of fat, it is not soluble in the body and must be transported as part of a specialised system used to move fats through the water-based blood.

The carrier systems of fats are called lipoproteins which you may have heard of as; low-density lipoprotein cholesterol (LDL-cholesterol) or high-density lipoprotein cholesterol (HDL-cholesterol).

- LDL delivers cholesterol to cells throughout the body and is also sometimes called 'bad' cholesterol as it has been linked to cardiovascular disease.
- HDL delivers excess cholesterol back from the body's cells to the liver for excretion and has been associated with a reduced risk of cardiovascular disease, hence 'good' cholesterol.
- Increased levels of circulating LDL-cholesterol have historically been linked to consuming foods which contain higher levels of cholesterol and advice was given to reduce these in the diet.

However, most of the cholesterol in our body is actually produced by the liver and as little as 10% of the cholesterol in the blood comes directly from the foods we consume. Our transport and metabolism of cholesterol is tightly regulated and current research understands it is influenced by both our individual genetics plus our diet and lifestyle factors.



Omega 3/6 Imbalance - Elevated

Your Result

Your overall score indicates a risk for essential fatty acid imbalance due to increased or decreased enzyme function responsible for omega-3 (FADS1) and omega-6 (FADS2) metabolism in the body. To determine the score we analysed your genetic variants alongside the dietary fat intake questionnaire and essential fatty acids deficiency checker questionnaire.

The ratio of omega-3 fatty acids to omega-6 fatty acids is important to balance. This is due to the fact that omega-6 fatty acids help generate pro-inflammatory chemicals. While these can aid the immune system to an extent, far too many of them can lead to chronic inflammation, which can in turn increase a person's susceptibility to disease. On the flip side, omega-3 fatty acids help to generate anti-inflammatory chemicals which can help to dampen chronic inflammatory messages.

Your Genetic Variants



FADS1

CC allele is associated with a functioning D5D enzyme responsible for omega-3 metabolism.

FADS1 gene encodes for the delta-5-desaturase (D5D) enzyme responsible for omega-3 metabolism. A genetic variant is associated with a reduced D5D enzyme activity which indicates an impaired omega-3 pathway. Research has indicated that reduced D5D activity is related to inflammatory states such as obesity and insulin resistance and thus the variants contribute to this risk.



FADS2

CT allele indicates an increased D6D enzyme activity which may impact downstream production of certain omega 6 fats leading to heightened inflammatory state. Carriers may consider reducing omega-6 dietary sources.

FADS2 gene encodes for the D6D activity in omega-6 enzyme. Increased D6D enzyme activity has been correlated to inflammatory states and a decreased need for omega 6.



Essential Fatty
Acids Deficiency
Questionnaire

Severe



Omega 3/6 Balance
Questionnaire

Severe

Lifestyle Interventions

What to do

- Reduce intake of omega 6 fats such as grain fed or non-free-range chicken and other meats and processed commercial fats.
- Ensure adequate intake of omega 3 fats such as non-farmed wild caught oily fish, green leafy vegetables, nuts, flax and chia seeds, and walnut oils.

More Information

Polyunsaturated fats are fatty acids known as PUFAs. Two well-known PUFAs are omega-3 and omega-6 fatty acids. Both omega-3 and omega-6 fatty acids are considered to be “essential fats” because the human body is unable to produce them naturally and they are essential for certain body processes.

The main types of omega 3 fatty acids are alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA), and all have different but important effects on overall health. While the main function of EPA is to help reduce inflammation, DHA is crucial for normal brain function and development. ALA is primarily used for conversion into EPA and DHA.

ALA is normally found in fats from plant foods, such as nuts and seeds (walnuts and rapeseed are rich sources). EPA and DHA, collectively called long chain omega 3 fats, are naturally found in fatty fish, such as salmon and fish oils including cod liver oil. Omega 3 fats are also readily available in supplements.

Gamma-linolenic acid (GLA), on the other hand, is an omega-6 fatty acid that’s necessary for maintaining brain function and can induce a weak anti-inflammatory effect. Good sources include certain oils like evening primrose oil and borage oil.



Blood Sugar Imbalance - Elevated

Your Result

Your overall score indicates this is an area that needs dietary and lifestyle support to provide future protection against developing blood sugar dysregulation conditions such as hyperglycaemia and insulin resistance.

To determine the risk score, we have assessed your genetic variants including ADIPOQ, GCKR, PPARG and TCF7L2 alongside the blood sugar sensitivity questionnaire to indicate if you may be symptomatic.

Your Genetic Variants



ADIPOQ

Carriers of two A variations of this gene have been associated with insulin resistance and risk of being overweight. You may benefit from lifestyle intervention including reducing sugar intake and exercise, particularly aerobic training.

Our fat storage (known as adipose tissue) also functions to release important hormone signals to the body. Adiponectin is one such hormone and one of its roles is making sure our tissues are sensitive to insulin. This allows muscles to burn fatty acids and to take up glucose from the bloodstream. A genetic variant of the **adiponectin coding gene ADIPOQ** has been associated with changes in this mechanism leading to insulin resistance.



GCKR

You are more predisposed to higher fasting blood glucose and insulin levels. You may benefit from increasing consumption of whole-grains and removal of refined sugars from your diet.

Glucokinase is a key enzyme involved in regulating how the liver either stores glucose as glycogen or uses glucose for energy. **GCKR** is a gene which produces an important regulatory protein for this pathway, helping to control the fate of glucose. A variant of the GCKR gene has been associated with changes in blood glucose and associated insulin levels.



Blood Sugar
Sensitivity
Questionnaire

Severe



PPAR γ

C allele is associated with higher fasting insulin levels leading to insulin resistance and risk of being overweight. Research has indicated that risk of developing type 2 diabetes is higher in obese individuals who carry this genotype and that it is important to avoid refined carbohydrates.

PPARG gene encodes a transcription factor (peroxisome proliferator-activated receptor gamma), a type of protein able to enter a cell nucleus and bind to DNA to regulate expression of genes. PPARG is a regulator metabolism of glucose.



TCF7L2

CT allele is associated with a moderate propensity towards insulin resistance. Carriers may benefit from consuming a diet lower in refined carbohydrates and higher in fibre.

TCF7L2 gene encodes a transcription factor (7-like 2), a type of protein able to enter a cell nucleus and bind to DNA to regulate expression of genes. TCF7L2 has many different roles in particular as a regulator of genes which affect insulin secretion. A genetic variant in this gene has been associated with changes in this proteins structure and its ability to regulate insulin sensitivity.

Lifestyle Interventions

What to do?

It is important to maintain an even blood sugar level. The more often blood sugar rises, the more insulin is produced and as more is produced, more sugar is turned into fat. Over time, the body's cells become less responsive (or resistant) to insulin, causing even more insulin to be produced which can lead to type 2 diabetes. The stage before this is known as prediabetic where blood sugar levels are higher than normal, but high enough to be diagnosed as type 2 diabetes.

In addition to excessive sugar consumption, there are other factors that contribute to the development of insulin resistance and type 2 diabetes including too much highly processed food, physical inactivity and low muscle mass, sleep deprivation, persistently high stress levels, disturbed gut bug ecosystem and low levels of vitamin D.

How do you know if you have prediabetes?

The results from a fasting plasma glucose or an HbA1c blood test can indicate if you are at risk. The following results indicate the presence of prediabetes:

- Fasting plasma glucose level of 5.5 to 6.9 mmol/L or an
- HbA1c level of 42 to 47 mmol/mol (6.0 to 6.4%)

Lower and your blood glucose levels are normal. If your results are above the upper limits for prediabetes, your GP may either diagnose you with type 2 diabetes or take another test in the near future to confirm whether you have diabetes.

Tip: Goal setting and making slow changes can help set yourself up for success.

Understanding blood glucose levels and prediabetes

The first step to reducing risk of blood sugar imbalance is to understand what makes blood sugar levels rise.

- **Glucose:** The carbohydrates and sugars in the food eaten turns into glucose (sugar) in the stomach and digestive system. Glucose can then enter the blood stream.
- **Insulin:** Insulin is a hormone that is made in the pancreas and helps the body's cells take up glucose from the blood and lower blood sugar levels.
- **Prediabetes:** If your doctor has told you that you have prediabetes this means your blood glucose levels are higher than normal, not high enough for you to be diagnosed with type 2 diabetes. It does mean you have a higher chance of developing type 2 diabetes.
- **Type 2 diabetes:** In type 2 diabetes glucose builds up in the blood instead of going to cells because,
 - The body develops "insulin resistance" and can't use the insulin it makes efficiently.
 - The pancreas gradually loses its capacity to produce insulin.
 - The result can be a higher blood glucose level.

Eat better

- Limit sugary foods and beverages. According to the World Health Organization, an average adult should consume only 10 per cent of their energy intake in the form of free sugars, or about 12 teaspoons per day.
- Follow UK guidelines to consume foods containing less than 5 per cent sugars using food labelling.
- Try to choose foods with a low glycaemic load as these slow the release of sugars into the blood stream.
- Fiber helps to slow the rate at which glucose enters the bloodstream, which can help to achieve good blood sugar control. Carbohydrates rich in fiber include **fruits, vegetables**, legumes (beans), and whole grains.

Get active

- If you spend long periods of time sitting, (this does not include sleeping) this is known as a 'sedentary' lifestyle. Being sedentary is associated with an increased risk of type 2 diabetes.
- Physical activity can help control and reduce type 2 diabetes health effects.

Maintain a healthy weight

You're more at risk of type 2 diabetes if you're overweight, especially if you're large around the middle. (Source: Diabetes UK)

Not all carbohydrates are the same

Sugar and carbohydrates are our most basic source of energy and are essential to life. However, we managed to "hack" nature by extracting pure sugars and adding them to foods, by refining carbohydrates and by heavily

processing foods. Eating excessive sugars and carbohydrates is the main reason why we put on weight.

Not all carbohydrates are the same. Simple carbohydrates are broken down quickly by the body and are in foods like sugar, white bread and pastas, whereas complex carbohydrates - the ones mother nature intended us to use to fuel our bodies - such as brown rice or quinoa, are broken down into glucose more slowly. When glucose is released slowly, our blood sugar levels remain more or less stable and we feel energised for longer. When glucose is released too quickly it disrupts the body's blood sugar levels, which can then be harmful to your health over the long term, and dramatically affect your ability to manage weight effectively.

Using glucose too quickly for energy is also what causes energy dips (also called "sugar crashes"). The more often blood sugar rises, the more insulin is produced and as more is produced, more sugar is turned into fat. Over time, the body's cells might become less responsive (or resistant) to insulin, causing even more insulin to be produced which can lead to diabetes.

How well sugar is absorbed and stored also partly depends on genetics. Some people will pull too much sugar from the carbohydrates that they eat or they may direct too much of the sugar in the blood into fat storage. Both problems might, in the long run, lead to weight gain, or type 2 diabetes. These health issues are preventable by being mindful of food and lifestyle choices.



Inflammation - Elevated

Your Result

We have assessed your client's genetic variants including IL6 Receptor (cytokine), TNF alpha (cytokine involved in systemic inflammation) and MnSOD. It is important to note that genetics alone do not affect response or susceptibility to inflammatory conditions, but also a person's environmental factors that also regulate gene transcription. These environmental factors can be diet, infection, pollution, sleep and stress.

Your client has the genetic predisposition for inflammation, and according to their inflammation questionnaire result, they may be experiencing symptoms of inflammation. This indicates your client's body is reacting or overreacting, to something.

Lifestyle/nutrition intervention: Try to avoid or limit foods that inflame as much as possible: shop-bought processed products, fried foods, and potential allergies or irritating substances such as alcohol. Replace with anti-inflammatory foods in their diet such as olive oil, green leafy vegetables (spinach, kale, collards etc.), nuts (like almonds and walnuts), fatty fish (like salmon, mackerel, tuna, and sardines) and colourful fruits (blueberries, cherries, oranges etc.). In addition, consider supportive nutrients such as omega-3, vitamin E, polyphenols (flavonoids), ascorbic acid (vitamin C) and curcumin.

Functional test to consider: Organic Acid Testing

Your Genetic Variants



IL6R

Carriers of the C allele may have a reduced immune response to an inflammatory diet and lifestyle. This may decrease chronic inflammatory markers and risk of immune-mediated inflammatory disease such as chronic heart disease. Research suggests it is important to optimise this benefit by engaging in lifestyle decisions to moderate the inflammatory component of diet such as high sugar intake

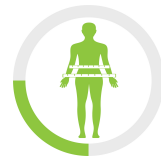
IL6R gene encodes the receptor for interleukin 6, a cytokine signalling molecule which has important roles in regulation of our immune-mediated inflammatory response. A variant in this gene has been associated with a change in the biological activity of IL6 leading to changes in our chronic inflammatory response.



CT



Inflammation
Questionnaire
Moderate



Waist/Hip Ratio
Healthy



MnSOD

Carriers of the C allele have increased activity of this cellular antioxidant enzyme. This leads to increased clearance of free radicals when the body is subjected to oxidative stressors such as high sugar diets, stress, alcohol and toxins in our environment. Due to the increased activity of this first free radical removing step, research has established a detrimental effect due a build-up of a secondary by-product known as peroxide. Peroxide may also cause damage to the cell and is usually cleared by antioxidants from our diet in a secondary reaction. However, if there is not a plentiful supply to keep up with its production this may lead to increased oxidative stress and low-grade inflammation. It is important for those carrying this variation to consume an antioxidant rich diet.

MnSOD gene encodes manganese superoxide dismutase, an important antioxidant enzyme. This enzyme is an important first step in a pathway to remove free radicals produced as a natural by-product of energy production pathways found in the majority of cells in the body. Free radicals can cause damage to cellular structures and processes so it is important to have effective mechanisms to remove these. A variant of this gene has been associated with a change in the structure of this enzyme and its efficiency.



TNFalpha

Carriers of the A allele have been associated with increased ability to produce tumour necrosis factor alpha and likelihood of chronic low-grade background inflammation. Evidence suggests that maintaining an anti-inflammatory based diet, particularly a high omega 3 to saturated fat ratio may be beneficial to reducing tumour necrosis factor alpha production.

TNF alpha gene encodes an inflammatory immune cytokine messenger, tumour necrosis factor alpha. Amongst its different roles tumour necrosis factor alpha is released from white blood cells (known as macrophages) in response to inflammatory signals which increase the immune inflammatory response. A genetic variant of this gene has been shown to increase the amount of tumour necrosis factor alpha and likelihood of chronic low-grade background inflammation.

Lifestyle Interventions

What to do?

To control inflammation, limit inflammatory stressors and load up on supporting foods and lifestyle habits! You

should pay special attention to the foods that can both promote inflammation as well as those that can be anti-inflammatory.

- **Include enough omega-3 fats** from oily fish (such as non-farmed, wild salmon, mackerel, herring, trout, tuna and sardines), flax and chia seeds.

Also try to **include some anti-inflammatory foods** such as olive oil, avocados, green leafy vegetables and nuts.

- **Try to avoid or limit foods that inflame as much as possible:** shop-bought processed products, fried foods, sugar, refined carbohydrates, peanuts, processed meats and potential allergies or irritating substances such as alcohol. Reduce intake of omega 6 fats such as grain fed or non-free-range chicken and other meats and processed commercial fats.
- **Get plenty of antioxidants** from fresh fruits and vegetables. Try to eat a rainbow of colours daily.
- **Manage stress and negative thoughts.** Research shows that people who ruminate (think about negative things in the past) tend to have a prolonged inflammatory response. Find some way to manage psychological and emotional stress so it isn't preying on your mind. See your Stress report for more information.
- **Sleep well,** 7-8 hours preferably. Sleep affects the expression of many genes that regulate our immune system. Lack of sleep can upregulate ("turn on") the pro inflammatory genes that can contribute to inflammation. See your Sleep report for more information.
- **Get moving.** Even a 30 minute brisk walk every day can reduce inflammation and downregulate ("turn off") the genes responsible for inflammation. Therefore, exercise is encouraged. However, make sure that it's the right kind of exercise for you and that you are not over-exercising as this can contribute to inflammation. Start slow and build up the intensity and frequency as you grow stronger and symptoms of inflammation subside.
- **Take care of your gut flora.** Inflammation can negatively affect gut flora and vice versa. Take care of your gut to stop or prevent this vicious cycle.
- **Lose some weight.** If you are overweight, try to gradually shed some pounds - fat cells churn out inflammatory proteins called cytokines.
- **Consider supplementation** if you're doing all of the above and still experiencing symptoms of inflammation. There are plenty of natural supplements out there, such as turmeric and curcumin, that can help relieve inflammation. Check with myDNAhealth customer support or your nutritional or healthcare practitioner on the right kind of supplement for your symptoms.
- If you're still feeling inflamed, **check for allergies or intolerances** that may possibly be causing or prolonging your inflammatory response. Ask your nutritional or healthcare practitioner on how to get tested.

More Information

How does it work?

Inflammation is a natural and mostly beneficial process by which our body responds to a pathogen, toxin, stress or trauma. When something stresses your body, it responds by swelling in an attempt to heal itself. Inflammation is necessary for proper tissue repair; however, systemic or chronic inflammation has a domino effect that can seriously undermine your health.

Symptoms of chronic inflammation can be persistent pain, low energy, frequent headaches, recurring allergies, high blood pressure and brain fog.

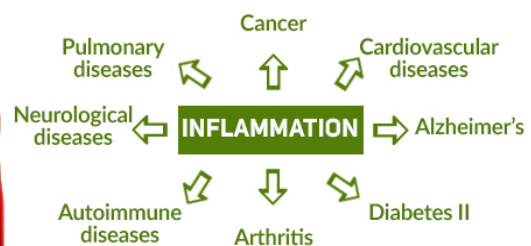
Inflammation also has a genetic component as certain genetic variants including IL6R, TNFa, MnSOD and the FADS, might make people more prone to inflammation. It is not an issue if those people are aware of their genetic predisposition and manage it through their lifestyle and diet.

A tendency for the body to overreact is also associated with a deficiency in essential fatty acids and their supportive nutrients, vitamins B3 and B6, biotin, vitamin C, zinc and magnesium. Vitamin B5 is also needed to make cortisol, the body's anti-inflammatory hormone.

What is systemic or chronic inflammation?

Long term chronic inflammation is a significant component of many health issues and a common denominator in the progression of many diseases such as diabetes, heart disease, autoimmunity and Alzheimer's. Unhealthy inflammation arises when our immune system's response goes out of control and doesn't "switch off", damaging our own healthy tissues.

When you catch a cold or sprain your ankle, your immune system switches into gear. Infection or injury trigger a chain of events called the inflammatory cascade. The familiar signs of normal inflammation such as heat, pain, redness, and swelling are the first signals that your immune system is being called into action. This is called acute inflammation.



Acute inflammation isn't a problem. If the inflammatory response flares up and then dies down, there's nothing to worry about - it signifies a well-balanced immune system. But symptoms of inflammation that don't recede are telling you that the "on" switch to your immune system is stuck. In some cases, what started as a healthy mechanism, like building scar tissue or swelling, just won't shut off - you may be exposed to something that your immune system keeps reacting to and there are not enough anti inflammatory substances in your body to stop that. This is called chronic inflammation.

It is also sometimes referred to as "hidden" inflammation as most people don't even know they're inflamed. It may sound relatively harmless, but this situation can lead to numerous health issues. If your immune system becomes overburdened, these inflammatory triggers are cycled continuously through your blood where they

affect nerves, organs, connective tissues, joints, and muscles. This is how disease develops.



Stress - Elevated

Your Result

According to the genetic variants you may be more sensitive to stress and your stress questionnaire results indicate that you are experiencing levels of stress. Life stressors are among the risk factors for depression and increasingly research is evidencing links to upregulation of the key areas of the immune system involved in inflammation.

Your Genetic Variants



CLOCK

C allele carriers are predisposed to get less sleep which is linked to increased daytime sleepiness, a preference for evenings and mood disturbance. This may lead to reduced ability to deal with factors in our life which influence our mood such as stress.

Our biological clock genetically regulates day and night fluctuations of various physiological processes such as sleep-wake cycles. Research has established that variations in the **CLOCK gene** influence our sleep and is involved in mood regulation particularly in response to stress.



COMT

A allele carriers are related to reduced efficiency of the COMT enzyme leading to higher levels of dopamine. Research has linked this to a tendency to be more sensitive to stress. Research has shown that those with two copies of this genetic variation perform better on working memory tasks under no-stress conditions.

Catechol-O-methyltransferase (COMT) is an enzyme which degrades some neurotransmitters involved in our stress response such as dopamine. A genetic variant in this gene has been associated with reduced activity of this enzyme leading to higher levels of dopamine.



MAOA

CC allele is not associated with changes to neurotransmitter levels.

MAO-A gene encodes an enzyme involved in breakdown of certain neurotransmitters such as serotonin (sometimes called the happy chemical). The balance of such neurotransmitters as serotonin are important for the regulation of emotional behaviours. A genetic variant of



this gene has been associated with increased activity of the MAO-A enzyme. As MAO-A is an X-chromosome linked gene, females will have two copies compared to males who have one copy.

Lifestyle Interventions

Tips to help you manage stress

Ensure that you are managing stress. If you're stressed, whether by your job or by something more personal, the first step to feeling better is to identify the cause. Below are some tips to help you destress. However, if you are struggling to cope and feeling overwhelmed then please consult with your nutritional or healthcare practitioner for additional support and guidance.

Get active: Exercise won't make your stress disappear, but it will reduce some of the emotional intensity that you may be experiencing, clearing your thoughts and helping you to deal with the problem more calmly.

Have some "me" time: Set aside some time for socialising, relaxation or exercise.

Avoid unhealthy habits: Don't rely on alcohol, smoking and caffeine as your ways of coping. You need to tackle the cause of your stress.

Work smarter: Working smarter means prioritising your work, concentrating on the tasks that will make a real difference. This means leaving the least important tasks to last.

Meditate: Try to meditate a few minutes each day to help ease anxiety.

Breathing techniques: Take a 5-minute break and focus on your breathing.

Look after your gut: Stress also impacts on digestion so a digestive enzyme may also be helpful during stressful periods.

More Information

How stress impacts your health

Stress is a normal physical response to events that make you feel threatened or upset your balance in some way. When you sense danger, whether it is real or imagined, the body's defences kick into high gear in a rapid automatic process known as the fight or flight reaction, or the stress response. The stress response helps you rise to meet challenges.

However, beyond a certain point, stress stops being helpful and starts causing major damage to your health, mood, productivity, relationships, and quality of life.

What happens when you experience stress?

When your body senses danger the adrenal glands release adrenaline and cortisol – hormones that provide you with the extra energy and strength required for either fight or flight. Ongoing stress means the cortisol levels are constantly elevated. Consequently, the adrenals produce too much cortisol and the effects of chronic overexposure to cortisol can be devastating.

Some consequences of prolonged cortisol elevations are abnormal blood sugar levels, loss of muscle mass and increase fat accumulation, especially in the stomach area and around the internal organs (which is known as

visceral fat). For example, when the cortisol is unbalanced, sleep patterns can also be affected. Excess cortisol keeps us awake which leads to further excess cortisol secretion the next day resulting in food cravings, and consequent weight gain. This is a vicious stress cycle.

How does stress affect your digestion?

Stress also impacts digestion and the gut may need additional support in the form of a digestive enzyme. Good stomach acid is also required to stimulate absorption of essential vitamins and minerals. Stress switches off stomach acid due to the fight or flight reaction!



Burnout - Moderate

Your Result

According to the genetic variants you may be more sensitive to stress and your questionnaire result may indicate if you are experiencing levels of burnout due to prolonged stress. Burnout can affect well-being and quality of life in various ways. This can lead to poor physical and mental health, as well as a sense of isolation from other people.

Your Genetic Variants



CLOCK

C allele carriers are predisposed to get less sleep which is linked to increased daytime sleepiness, a preference for evenings and mood disturbance. This may lead to reduced ability to deal with factors in our life which influence our mood such as stress.

Our biological clock genetically regulates day and night fluctuations of various physiological processes such as sleep-wake cycles. Research has established that variations in the **CLOCK gene** influence our sleep and is involved in mood regulation particularly in response to stress.



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A allele carriers are related to reduced efficiency of the COMT enzyme leading to higher levels of dopamine. Research has linked this to a tendency to be more sensitive to biological stressors including increased adrenal response. Research has shown that those with two copies of this genetic variation perform better on working memory tasks under no-stress conditions.

Catechol-O-methyltransferase (COMT) is an enzyme which degrades some neurotransmitters involved in our stress response such as dopamine. A genetic variant in this gene has been associated with reduced activity of this enzyme leading to higher levels of dopamine.



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Burnout
Questionnaire
Typical

chemical). The balance of such neurotransmitters as serotonin are important for the regulation of emotional behaviours. A genetic variant of this gene has been associated with increased activity of the MAO-A enzyme. As MAO-A is an X-chromosome linked gene, females will have two copies compared to males who have one copy.

Lifestyle Interventions

What to do?

In order to manage burnout and eventually overcome it, the first step is recognising that you are experiencing it.

Being under constant pressure to achieve, with few opportunities to take real breaks from work, can add to your levels of stress. This can make you feel overwhelmed and more likely to reach the burnout stage. For example, too intense a workload, paired with a toxic work environment and other sources of stress, can lead to burnout. But aside from an overwhelming workload, other factors can also contribute to stress levels and lead to burnout.

There are things you can do to support your adrenals and recover from the symptoms of burnout that you may be feeling.

- **Share your experiences with others.** One way of getting to the root of the problem is by sharing your experiences with someone. Try speaking to a friend, colleague or family member.
- **Get at least 8 hours of sleep every night,** keep to a regular schedule and rest when you're tired (see Sleep section for more information on sleep hygiene).
- **Manage stress** to keep the stress levels in the healthy range (see Stress section for more information).
- **Limit caffeine** intake to avoid overstimulating your adrenals.
- **Limit sugar and refined carbohydrates** in your diet.
- **Ensure enough nutrient-dense foods** in your diet - especially in the morning - such as coconut, avocado, oily fish, nuts and seeds. They will give you energy and beat your cravings for salty or sugary foods without raising your blood sugar levels.
- **Avoid environmental toxins.**
- **Eat regularly** and at about the same times every day.
- **Stay hydrated.**
- **Exercise.** Exercise can help support the adrenal function and also help to reduce stress and cravings. However, too much exercise can contribute to symptoms of adrenal fatigue - listen to your body.
- If you are following the above guidelines and still experiencing symptoms, **consider supplementing with adaptogenic herbs**, such as ashwaganda, ginseng, licorice root, holy basil. Consult your nutritional or healthcare practitioner before taking supplements.

The difference between stress and burnout

Burnout is a state of emotional, mental, and physical exhaustion caused by excessive and prolonged stress. It occurs when you feel overwhelmed, emotionally drained, and unable to meet constant demands. As the stress continues, you begin to lose the interest or motivation that led you to take on a certain role in the first place.

Burnout reduces productivity and saps your energy, leaving you feeling increasingly helpless, hopeless, cynical, and resentful. Eventually, you may feel like you have nothing more to give.

Burnout is a gradual process. The signs and symptoms are subtle at first, but they get worse as time goes on. Think of the early symptoms as red flags that something is wrong that needs to be addressed. If you pay attention and act to reduce your stress, you can prevent a major breakdown. If you ignore them, you'll eventually burn out.

Burnout may be the result of unrelenting stress, but it isn't the same as too much stress. Stress, by and large, involves too much: too many pressures that demand too much of you physically and psychologically. Stressed people can still imagine, though, that if they can just get everything under control, they'll feel better.

Burnout, on the other hand, is about not enough. Being burned out means feeling empty, devoid of motivation, and beyond caring. People experiencing burnout often don't see any hope of positive change in their situations. If excessive stress is like drowning in responsibilities, burnout is being all dried up. And while you're usually aware of being under a lot of stress, you don't always notice burnout when it happens.



Caffeine Sensitivity - Slow Metaboliser

Your Result

You are a slow metaboliser of caffeine and should limit your caffeinated drinks. Excessive consumption of caffeine can increase your risk of cardiovascular problems such as hypertension.

Your Genetic Variant



CYP1A2

CC allele is likely a slow metaboliser of caffeine.

The CYP1A2 gene contains instructions for an enzyme that breaks down the caffeine you consume.

Lifestyle Interventions

What you can do

- **Limit or reduce caffeine.** If you consume caffeine, current guidelines recommend that healthy adults drink no more than 400mg of caffeine a day. If you consume caffeinated coffee, research indicates you should stick to 2 cups or less a day to reap the best health benefits. But keep in mind that the actual caffeine content in beverages varies widely, especially among energy drinks. If you consume coffee, research indicates you should stick to 2 caffeinated cups or less a day to reap the best health benefits of the antioxidant compounds naturally present in coffee beans.
- **Avoid caffeine after 12pm.** Since caffeine hangs around in your system for several hours, consider avoiding caffeine starting mid-afternoon or earlier if you want a good night's sleep. If you fancy a warm drink in the afternoon or evening, try switching to caffeine free or herbal teas.

Caffeine guide

This is how much caffeine is in a cup (250ml) of black coffee, latte, energy drink, black tea, green tea and cola:

Latte: 113-280mg

Instant coffee with one teaspoon: 60-70mg

Black tea: 30-50mg

Green tea: 30-50mg

Energy drink: 80mg

Cola: 36-48mg

More Information

How does caffeine keep you awake?

Caffeine interferes with the brain system that causes sleepiness. A molecule called adenosine acts as a signal between brain cells to bring on sleepiness. Caffeine blocks adenosine's signals, making you feel more alert. This is why caffeine can make it hard to fall asleep and can interfere with deep sleep.



Lactose Intolerance - Typical

Your Result

You do not have the genetic variant that may predispose to being lactose intolerant. You are therefore likely to be able to consume dairy without common digestive issues such as bloating.

Your Genetic Variant



MCM6

The T allele is both the more common allele and the one associated with lactase persistence and thus reduction in the potential for abdominal discomfort caused by lactose intolerance.

MCM6 is part of the MCM complex that helps to regulate the activity (expression) of the **LCT gene**, which encodes for the lactase enzyme. This enzyme helps to digest lactose, a sugar found in milk and other dairy products.

Lifestyle Interventions

What you can do

Lactose intolerance is a common digestive problem where the body is unable to digest lactose, a type of sugar mainly found in milk and dairy products.

If you think you have lactose intolerance, you can try avoiding foods and drinks containing lactose for two weeks to see if your symptoms improve.

Symptoms of lactose intolerance usually develop within a few hours of consuming food or drink that contains lactose. They may include:

- flatulence (wind)
- diarrhoea
- bloated stomach
- stomach cramps and pains
- stomach rumbling
- feeling sick

The severity of the symptoms and when they appear depends on the amount of lactose you consume. Some people may still be able to drink a small glass of milk without triggering any symptoms, while others may not

even be able to have milk in their tea or coffee.

More Information

What causes lactose intolerance?

The body digests lactose using a substance called lactase. This breaks down lactose into two sugars called glucose and galactose, which can be easily absorbed into the bloodstream.

People with lactose intolerance don't produce enough lactase, so lactose stays in the digestive system where it's fermented by bacteria. This leads to the production of various gases, which cause the symptoms associated with lactose intolerance.

Depending on the underlying reason why the body isn't producing enough lactase, lactose intolerance may be temporary or permanent. Most cases that develop in adults are inherited and tend to be lifelong.



Risk for Vitamin D Deficiency - Elevated

Your Result

You have genetic variants which may predispose you to a vitamin D deficiency. In addition to bone health, emerging evidence from clinical studies has indicated that vitamin D deficiency is associated with several inflammatory diseases. Please discuss getting your vitamin D levels checked with your nutritional or healthcare practitioner.

Your Genetic Variants



VDRfok

The T allele has poorer calcium absorption than the C allele. Ensure adequate calcium (in the form of Microcrystalline hydroxyapatite), magnesium and vitamin D3 and reduce caffeine to 300mg per day. T allele carriers are also more susceptible to insulin resistance when deficient in vitamin D. The VDR gene produces the vitamin D receptor protein, responsible for binding vitamin D.



VDRtaq

The T allele means a person does not readily absorb vitamin D from sun exposure. This may also contribute to seasonal depression, particularly when the sun is at its lowest in the Autumn/Winter season. Studies have noted a strong correlation between vitamin D deficiency and neurological degeneration. The VDR gene provides instructions for making a protein called vitamin D receptor, which allows the body to respond appropriately to vitamin D. VDR proteins are found in the brain and stimulates the enzymes that generate dopamine. Low vitamin D is related to a number of neurological and immunological conditions. Studies show a relationship between Type 2 diabetes mellitus and vitamin D deficiency. Vitamin D deficiency can be seen in diseases such as Cardio metabolic syndrome disorders and osteoporosis.

Lifestyle Interventions

What you can do

The new advice on vitamin D from Public Health England, recommends that adults should have 10 micrograms (mcg) of vitamin D every day.

Sunlight: Our main source of vitamin D is from the action of sunlight on our skin. However, during winter (from October until the end of March) in many Northern hemisphere countries the sunlight does not contain enough

UVB radiation to make vitamin D. People with dark skin, from African, African-Caribbean and South Asian backgrounds, may not get enough vitamin D from sunlight in the summer.

Food: Vitamin D is found naturally in a small number of foods, including oily fish such as salmon, mackerel, herring and sardine, as well as red meat, liver and egg yolks. It's also found in fortified foods. However, it's difficult for us to get the recommended amount of vitamin D from food alone.

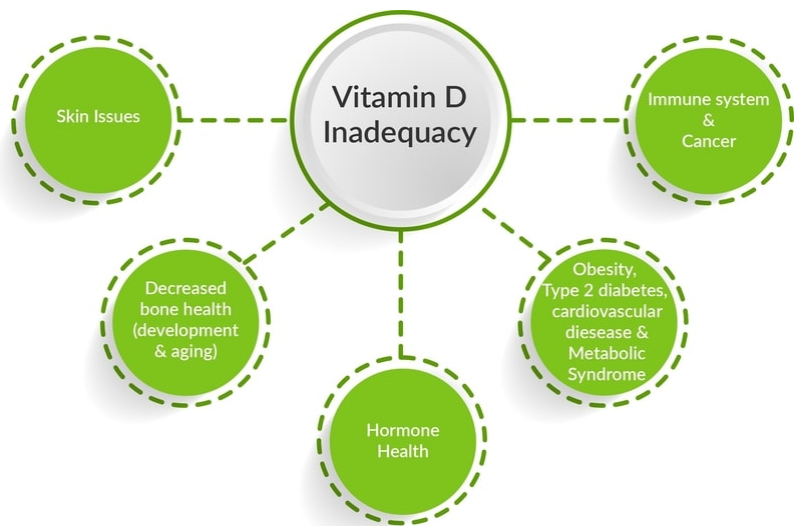
Supplement: If you live in the Northern hemisphere and experience limited exposure to sunlight, then you may want to consider taking a vitamin D3 supplement, especially during the darker winter months. If you have a darker skin colour then you may need to take a supplement year round.

More Information

What does vitamin D do to the body?

We need vitamin D to help the body absorb calcium and phosphate from our diet. These minerals are important for healthy bones, teeth and muscles. A lack of vitamin D, known as vitamin D deficiency, can cause bones to become soft and weak, which can lead to bone deformities. However, we are increasingly understanding that Vitamin D is required by every cell and its deficiency can cause a variety of symptoms in addition to bone decalcification including chronic

fatigue, lowered immune response, inflammation, or muscular-skeletal pain such as lower back pain. This is because vitamin D has crucial regulatory roles in our body and is even able to talk directly to our DNA to up regulate important genes.



Importance of vitamin D

The information about the importance of Vitamin D continues to increase. Some of the human disease's being associated with vitamin D adequacy are highlighted here.



Detoxification - Elevated

Your Result

Your overall score indicates you may be at increased risk of having impaired detoxification pathways. To determine the risk score, we have assessed your genetic variants and gene deletions including CYP1A1, CYP1A2, COMT, NQO1, GSTM1 and GSTT1 alongside the toxicity and sleep questionnaires to determine if your lifestyle is supporting or hindering the detoxification pathways.

Your Genetic Variants



CYP1A1

The AA genotype is not associated with increased CYP1A1 activity. No impact.

Cytochrome P-450 1A1 (CYP1A1) gene encodes a member of the Phase 1 Cytochrome P-450 family of enzymes. These enzymes are responsible for the first step (Phase I) of the breakdown of substances which need to be removed from the body known as detoxification.

CYP1A1 is involved in the conversion of environmental procarcinogens such as poly-aromatic hydrocarbons (PAHs) sources of which include smoking, wood smoke, vehicle fumes and charred meats (barbeque). This first step of the removal of PAHs metabolises PAHs into an intermediate more active form which allows the Phase II of detoxification to excrete these substances from the body.

A genetic variant of CYP1A1 gene has been identified which speeds up the conversion of PAHs to more active intermediates which can cause their build up if the body is unable to keep up the pace of its phase II excretion pathways.



CYP1A2

CC allele is associated with a slow metaboliser meaning you will feel the effects of caffeine for a longer time. This enzyme's activity can be enhanced by eating more cruciferous vegetables such as broccoli and Brussel sprouts.

Cytochrome P450 (CYP450) is a group of genes that code for enzymes that make and metabolise endogenous (products your body makes) and xenobiotic (foreign) substances. They are generally found in liver cells, but



Sleep Questionnaire

Severe



Toxicity
Questionnaire

Severe



can be found throughout the body. **Cytochrome P-450 1A2 (CYP1A1)** gene encodes a member of the Phase 1 Cytochrome P-450 family of enzymes. CYP1A2 is an enzyme found in the liver that plays an important role in toxin and drug metabolism. These enzymes are responsible for the first step (Phase I) of the breakdown of substances which need to be removed from the body known as detoxification.



COMT

The A allele has been associated with lower activity of the COMT enzyme. This may mean that you inactivate some hormones, brain chemical messengers, medicinal products and food compounds at a slower rate compared to those who have a higher COMT enzymatic activity. This may mean you retain and be exposed to certain compounds for a longer time.

Research has identified that those with the AA genotype may experience difficulties in breaking down dopamine causing higher levels in the brain if methylation is unsupported. This has led to observations that the AA genotype have an increased brain processing ability and enhanced vulnerability to stress, plus a lower pain threshold. This genotype is sometimes referred to as "The Worrier" as they are more prone to anxiety related conditions after trauma.

Carriers should support methylation which includes nutrient cofactors and methyl donors such as methionine, vitamins B12 and B6, betaine, magnesium and folate which can be found in a range of foods.

Methylation is a phase 2 detoxification pathway where a methyl group is transferred from the conjugating donor compound S-adenosyl-L-methionine (SAME) using a class of enzymes known as methyltransferases.

Catechol-O-Methyltransferase (COMT) is a key methyltransferase enzyme which is known to help degrade certain hormones and neurotransmitters (catechol oestrogens and catecholamines), some medicines and food compounds which contain catechol structures (such as green tea, apples, red wine and chocolate).

A genetic variation in the encoding COMT gene has been shown to change the COMT enzyme structure and affects its rate of action.



GSTM1

A GSTM1 deletion indicates a reduced capacity to metabolise numerous xenobiotic (e.g. phytochemicals and therapeutic drugs) and endogenous (e.g. steroid hormones) compounds. If the conjugation reaction between these toxins and glutathione is impaired there will tend to be an accumulation of these unstable compounds.



This can contribute to the symptoms of fatigue, depression, allergy, asthma, infertility, obesity and hormonal upsets due to reduced detoxification capacity. Oxidative stress and lifestyle factors such as taking medication, exposure to environmental toxins and poor diet can further contribute to these symptoms.

Glutathione metabolism is one of the body's most powerful detoxifying systems. An active reduced form of Glutathione (GSH) may be used in a phase II detoxification reaction to make compounds water soluble and so enable them to be excreted from the body in the urine. This is achieved by conjugating the compound (to be excreted) to GSH by an enzyme family known as the Glutathione S-Transferases (GSTs).

Glutathione S-transferase M1 (GSTM1) is one of the most biologically active member of the GST gene super-family. It is responsible for the removal of xenobiotics, carcinogens and products of oxidative stress. The GST genes are a bit different from the other genetic variants that we test as they are not a single nucleotide change per se – the whole gene is either inserted or deleted. Therefore, we test the whole gene to establish whether they are either present and functioning or absent, rather than just a certain position in the gene.

P

GSTT1

A GSTT1 insertion (present) means the enzyme is functional. However, if overexposed to toxins you can still exhaust this cleansing system.

Glutathione metabolism is one of the body's most powerful detoxifying systems. An active reduced form of Glutathione (GSH) may be used in a phase II detoxification reaction to make compounds water soluble and so enable them to be excreted from the body in the urine. This is achieved by conjugating the compound (to be excreted) to GSH by an enzyme family known as the Glutathione S-Transferases (GSTs).

Glutathione S-transferase T1 (GSTT1) is a biologically active member of the GST gene super-family. It is responsible for the removal of xenobiotics, carcinogens and products of oxidative stress.

The GST genes are a bit different from the other genetic variants that myDNAhealth analyses as they are not a single nucleotide change per se – the whole gene is either inserted (present) or deleted (absent). Therefore, we test the whole gene to establish whether they are either present and functioning or absent, rather than just a certain position in the gene.

CC

NQO1

The CC genotype is not associated with reduced NQO1 activity. No impact.

NAD Quinone Oxidoreductase type 1 (NQO1) is an important enzyme with

a wide range of biological functions, including the maintenance of appropriate redox levels in cells and detoxification of certain xenobiotics and carcinogens.

A genetic variant causes a change to the protein structure and leads to reduced NQO1 enzymatic activity. This reduced antioxidant capacity has been associated with increased homocysteine levels in cardiovascular disease and, when exposed to pollution a lack of tolerance to benzene compounds and cancer susceptibility.

Lifestyle Interventions

What to do

The liver is the main detoxification organ of the body responsible for neutralising and eliminating the extra toxins that our bodies are exposed to on a daily basis. When optimum nutrition is provided, the liver operates efficiently. Unfortunately, too many people have diets that are toxic or contain insufficient nutrients to provide the liver with everything it needs for the detoxifying process. If nutrition is compromised through these poor dietary and lifestyle habits, the detoxification process will be impaired and health will suffer as the body retains the toxins it cannot eliminate.

You will therefore need to support this important process through diet, toxin avoidance and vigilant lifestyle habits.

- Minimise exposure to toxins.
- The GST enzymes are induced in part by phytochemicals such as glucosinolates of cruciferous vegetables, curcumin from turmeric and allylic sulphides from allium vegetables. As part of your detoxification protocol support by adding a variety of these foods to your client's daily diet to increase activity of the other, functioning GST enzymes.
- In addition, research has shown Vitamin C is metabolised by GSTs and those who have reduced activity of these enzymes may have difficulty in utilising this important vitamin. It is important to ensure intake of plenty of vitamin C rich food sources. Implement detoxification protocols such as a diet rich in antioxidants and minimised exposure to toxins.
- **Supplementation:** Please discuss with your health or nutritional professional before starting any supplements.

More Information

What is detoxification?

Detoxification Pathways



Metabolic detoxification is the physiological process which deactivates and removes toxins such as used hormones, ingested medicines and food components, pollution and the products of immune activation from the body. This process involves the biotransformation and conjugation of toxins through two main pathways.

Phase 1 detoxification

Phase 1 (biotransformation) largely involves the cytochrome P450 family of enzymes which act to biotransform toxins through oxidation, reduction or hydrolysis reactions. This first phase of reactions purpose is to make compounds which need to be removed from the body water soluble but as a consequence this can activate toxins further (known as activated intermediates) due to the formation of electrophilic species.

Phase 2 detoxification

These potentially harmful intermediate compounds must be further metabolised by phase 2 enzymes which bind them to compounds allowing them to be excreted from the body.

Genetic impact on detoxification

It is known that various genetic variations in the enzymes involved in both the phase 1 and 2 detoxification pathways will affect the rates at which these metabolic processes occur and our individual genetic detoxification capacity.



Methylation Cycle Imbalance - Moderate

Your Result

Your overall score indicates you may be at risk of having an imbalance in the methylation cycle. To determine the risk score, we have assessed your genetic variants including MTHFR677, MTHFR1298, MTR and MTRR alongside the sleep and toxicity questionnaires to determine if your lifestyle is supporting or hindering this important process.

Your Genetic Variants



MTHFR677

CC allele is a common or 'wild type' form. No impact to MTHFR enzyme efficiency has been associated with this genotype.

MTHFR is a gene which codes for **methylenetetrahydrofolate reductase** enzyme, responsible for the conversion of 5,10 methylenetetrahydrofolate (5,10-MTHF) to 5-methyltetrahydrofolate (5-MTHF) an important rate-limiting step of the folate cycle. 5-MTHF is the biologically active form of folate, which is required for converting homocysteine into methionine, a crucial step in the methionine cycle.

Genetic variants in the MTHFR gene can be associated with reduced methylenetetrahydrofolate reductase efficiency. A common genetic variant known as **MTHFR677** results in a change to the MTHFR protein structure and reduction in activity.



MTHFR1298

The C allele may result in reduced function of MTHFR enzyme. Methylation may need to be supported if in combination with MTHFR677 genetic variation and if functional testing shows low plasma folate/high homocysteine levels.

MTHFR is a gene which codes for **methylenetetrahydrofolate reductase** enzyme, responsible for the conversion of 5,10 methylenetetrahydrofolate (5,10-MTHF) to 5-methyltetrahydrofolate (5-MTHF) an important rate-limiting step of the folate cycle. 5-MTHF is the biologically active form of folate, which is required for converting homocysteine into methionine, a crucial step in the methionine cycle.

Genetic variants in the MTHFR gene can be associated with reduced



Sleep Questionnaire

Severe



Toxicity
Questionnaire

Severe



methylenetetrahydrofolate reductase efficiency. Another genetic variant known as **MTHFR1298** results in a change to the MTHFR protein structure and has been associated with a reduction in activity if in combination with MTHFR677 variant.

AG

MTR

The G allele is associated with decreased levels of homocysteine as this genetic variant increases the activity of the MTR enzyme (conversion of homocysteine to methionine) possibly causing a decrease in methyl group availability.

The increase in MTR activity may cause methyl-B12 to be used more quickly than normal and those with this variant may need to support adequate methyl-B12 levels.

Methionine Synthase (MTR) encodes the enzyme that catalyses the conversion of homocysteine to methionine and is dependent on methyl cobalamin (methyl-B12). A genetic variant has been associated with a change to the enzyme structure near to the cobalamin binding site.

AG

MTRR

The G allele is associated with a somewhat reduced MTRR efficiency and increased need for methyl-B12.

Methionine Synthase Reductase (MTRR) encodes an enzyme that regenerates methyl cobalamin (methyl-B12) needed for MTR to regenerate homocysteine into methionine. MTRR and MTR are both a vital part of the methylation cycle.

Lifestyle Interventions

What to do

To support the methylation process you can benefit from these dietary and lifestyle tips.

- **Healthy sleep pattern:** It is important to ensure healthy sleeping habits.
- **Reduce stress:** Stress can hamper methylation. Try meditation if you are feeling stressed.
- **Diet:** Eat plenty of organic leafy greens and proteins daily.
- **Get active:** Include moderate exercise as part of your daily routine.
- **Avoid toxins:** Avoid exposure to toxins is important! Look at your household cleaning supplies and cosmetics, try opt for more natural, preservative free, non toxic products.
- **Supplements:** If you have symptoms such as fatigue, insomnia, depression, inflammation, brain fog and hormonal imbalances, you may need to introduce a supplement that gently supports methylation. Please discuss supplementation with your nutritional or healthcare practitioner. It is not advisable to take

supplements without the support of a qualified professional.

More Information

What is Methylation?

Methylation is the attachment of a one-carbon methyl group (CH₃), onto a compound. This process is critical for proper DNA function, gene regulation, amino acid metabolism, and neurotransmitter (dopamine, serotonin, adrenaline, noradrenaline) synthesis.

MTHFR, MTR, and MTRR are three key enzymes with vital roles in the folate and methionine cycle metabolisms, which affect neurotransmitter synthesis, methylation capacity and gene expression, and homocysteine metabolism.

Homocysteine is an amino acid formed as a result of the metabolism of another amino acid, methionine, which is essential for normal growth and metabolism. Homocysteine in turn is converted back into methionine in a constant recycling process. The proper balance between homocysteine and methionine is essential.

Folate is a crucial molecule involved in these reactions. It can be derived from our diet but has to then be converted into a biologically active form of folate, 5-MTHF (5-methyltetrahydrofolate).

Methylenetetrahydrofolate reductase (MTHFR) is the enzyme which catalyses conversion of a folate intermediate (5,10-MTHF) to 5-MTHF, the biologically active form. 5-MTHF is required for converting homocysteine into methionine, a crucial step in the methionine cycle and the production of S-adenosyl methionine (SAME) a key methyl donor. SAME is able to donate its available methyl group to compounds such as DNA, RNA, proteins or lipids (using methyltransferase enzymes) becoming S-adenosylhomocysteine and then homocysteine.

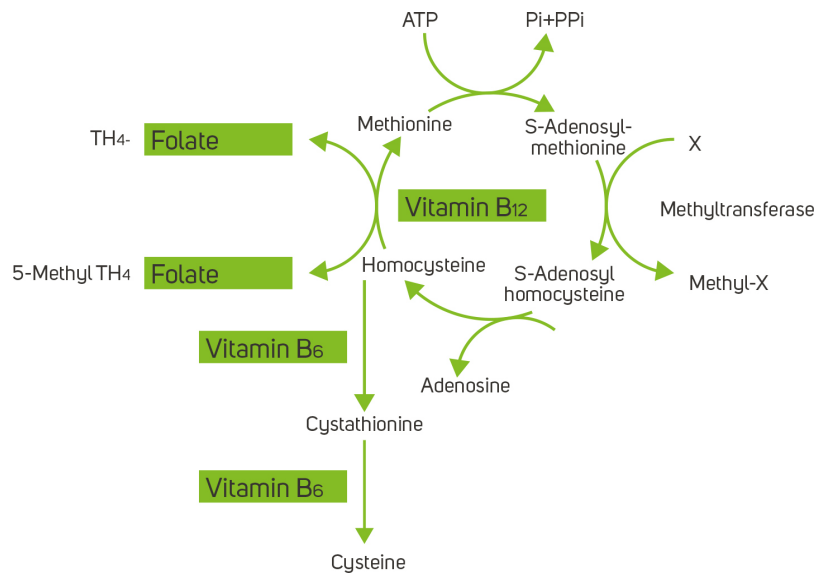
Homocysteine can go on to become cysteine, taurine, glutathione (vitamin B6-dependent) or it can be converted back to methionine by methionine synthase (MTR), closing up the two metabolic cycles.

MTR and its partner enzyme MTRR (methionine synthase reductase) work together in the methionine cycle. MTR works in the final step to regenerate homocysteine into methionine using methyl cobalamin (methyl-B12), and MTRR regenerates the methyl cobalamin for MTR to use.

What supports and hinders methylation?

The methylation cycles can be influenced by diet, as folate can be obtained from food. Low folate may translate to low 5-MTHF levels leading to homocysteine accumulation due to impaired ability to convert it back to methionine. High homocysteine is usually found in combination with low folate and B12, also low monoamine neurotransmitters (serotonin, epinephrine, dopamine).

Folate and methionine cycle metabolisms are inter-linked, and low folate/high homocysteine levels have been associated with many diseases including various cardiovascular (CVD) complications, renal diseases, and neurodegenerative disorders. Environmental factors such as diet, chemical or drug exposure, sleep and stress can also play a role in hampering methylation.



Impact of methylation cycle imbalance

Methylation cycle imbalance may contribute to health issues, including;

- Cardiovascular disease
- Diabetes
- Chronic fatigue syndrome
- Increased susceptibility to stress
- Free radical damage (premature ageing)
- Build-up of toxins, hormones and heavy metals
- Mood disorders presenting as depression or anxiety
- High histamine-related conditions such as hayfever and hives
- Autoimmune conditions such as MS, psoriasis and Rheumatoid Arthritis
- Oestrogen-related hormonal disorders, including PCOS, fibroids and PMS
- Pregnancy-related disorders such as unexplained miscarriage and infertility



Risk for coeliac disease - Medium

Your Result

According to the algorithm you may have a moderate risk of developing coeliac disease when consuming a diet that is high in gluten. You may be sensitive to gluten or allergic to certain grains, such as wheat. Checking your Gluten Sensitivity Questionnaire results and referring to our guide [Food-Related Immune Responses – What's the difference?](#) may help identify these symptoms. Discuss the result further with your nutritional or healthcare practitioner if you experience symptoms when eating gluten containing foods.

Important: Please discuss this with your nutritional or healthcare practitioner before making any dietary changes. Do remember that your DNA results are not a diagnosis, only a risk factor inferring genetic susceptibility to coeliac disease, but it does not mean the disease will develop.

What to do

How to eat gluten-free

If you decide to reduce gluten, then below are a few tips to help you get started.

- Opt for grains that do not contain gluten including rice, corn, amaranth, and millet, and non-grains such as quinoa and buckwheat.
- Avoid products that are made with wheat, rye, barley or triticale (a hybrid of wheat and rye).
- Pure oats should be consumed in moderation if tolerated, while regular oats (which contain wheat) should be avoided.
- Limit commercially produced gluten-free product sold in shops as they can contain added sugars and are generally low in nutrients.
- Avoid bread (wheat, rye, spelt), wheat pasta, couscous, tabbouleh, pearl barley, semolina, beer/lager, batter, rusk, flours containing wheat, rye and barley and baking powder.
- Avoid commercial gravies, stocks and sauces and always check labels and ingredients carefully.
- Remember, gluten-free foods include all unprocessed vegetables, fruit, dairy products, fish, meat, poultry, nuts, legumes, seeds, fats and oils.

More Information

An introduction to gluten and coeliac disease

Gluten is a mixture of proteins found in grains such as wheat, barley, rye and products containing these grains. Coeliac disease represents the most severe form of gluten intolerance and is a serious condition that makes someone hypersensitive to gluten. It affects about one per cent of the population; however, cases of milder



Gluten SNP's
Algorithm
Medium



Gluten
Questionnaire
Moderate

sensitivity to gluten without being coeliac have been reported.

What happens in your body if you're sensitive to gluten?

The ingestion of gluten causes the small intestine to be inflamed and unable to absorb nutrients, causing a wealth of unpleasant symptoms, including bloating, diarrhoea, abdominal pain, weight loss, headaches, fatigue. This is because certain substances in gluten are recognised as foreign cells that the immune system tries to attack, damaging healthy intestinal tissue in the process. Human leukocyte antigens (HLAs) are the ones reacting to the gluten "threat". HLA is involved in the immune response and they help to distinguish between own and foreign cells.



The genetic factor: HLA genes

Coeliac disease is very complex, but it does have a strong genetic component. It is triggered by the ingestion of gluten in genetically predisposed individuals and can occur at any point throughout life. So, even if you don't currently experience any symptoms of gluten sensitivity, if you have the genetic variants in the HLA gene complex region then this predisposes you to coeliac disease, and continuous exposure to gluten might trigger it later in life. The HLA genes are the most important genetic predictor of gluten intolerance.

The HLA genes produce a group of proteins called the HLA complex, which are responsible for how the immune system distinguishes between the body's own proteins and foreign, potentially harmful proteins. Approximately 99% of people with coeliac disease and 60% of those with non-coeliac gluten sensitivity have the DQ2 or DQ8 risk version of HLA, compared to only 30% of the general population. Six variations in the HLA genes can be used to classify individuals into risk groups for gluten intolerance. This risk prediction is based on a scale of low, medium or high risk.

Having the genetic variants is a factor but does not mean you have coeliac disease. In other words, it indicates an increased risk to develop coeliac disease in your life time but it does not mean that you will definitely develop coeliac disease.



Response to cholesterol lowering foods - Unlikely Beneficial

Your Result

Your BMI, cholesterol insights and/or saturated fat balance results indicate they may have unbalanced blood cholesterol profiles. If balancing their blood cholesterol profile is of a concern it is useful to understand that CYP7A1 G allele carriers have been shown to have benefit from consuming functional foods such as plant sterols or beta-glucan.

Alongside this, G allele carriers may also be sensitive to increased total cholesterol and LDL-C when including dairy in the diet.

Your Genetic Variants



CYP7A1

GG allele is associated with some improvement in higher blood cholesterol profiles when plant sterol and/or beta-glucan foods are included in the diet. In addition, this genotype is at increased risk of increasing total and LDL-cholesterol blood levels with regular consumption of fat containing dairy products.

CYP7A1 encodes a member of the cytochrome P450 family of enzymes, cholesterol 7 alpha-hydroxylase. This protein catalyses the first step in the conversion of cholesterol to bile acids and then subsequent removal of excess cholesterol from the body. This is an important reaction as it is the point which is most likely to restrict the speed of this whole process.

A genetic variant affecting the gene promoter region of CYP7A1 has been associated with variation in bile acid synthesis and subsequently can affect cholesterol homeostasis. Studies have found CYP7A1 genetic variant affects how well foods such as plant sterols and beta-glucan (found in many cholesterol-lowering functional food products) will reduce total cholesterol (TC) and Low-Density Lipoprotein cholesterol (LDL-C).

Lifestyle Interventions

What does this mean?

This means you are likely to see some improvement in blood cholesterol levels by including food products specifically marketed for cholesterol reduction such as yoghurts and butter replacements which contain these functional foods.

However, it is not mandatory to include these products in a cholesterol lowering protocol. It is also important to note that the effect of these products will be extremely limited without being a part of healthy lifestyle choices designed to balance cholesterol profiles.



BMI

Obese



Cholesterol

Moderate



Saturated Fat
Balance

Severe



Omega Balance



Severe

Please read your saturated fat and cholesterol insights reports for further guidelines on balancing your blood cholesterol profile through dietary choices.

In addition, focus on reducing consumption of fat containing dairy products due to increased risk of increasing total and LDL-cholesterol blood levels with the CYP7A1 G allele

Tips for modifying blood cholesterol levels

Please read your saturated fat and cholesterol insights reports for further guidelines on balancing your blood cholesterol profile through dietary choices.

More information

Bile acids (BAs) are produced in the liver from cholesterol via a rate limiting cytochrome P450 enzyme cholesterol 7 α -hydroxylase (CYP7A1) which, is regulated at the gene expression level by both cholesterol and BA quantities.

Research reviews of this area suggests that a genetic variant located in the promoter region of the gene CYP7A1 may predict response to functional foods such as; plant sterols and beta-glucan's abilities to reduce total cholesterol (TC) and Low-Density Lipoproteins cholesterol (LDL-C). It is thought that carriers of a CYP7A1 G allele who also have raised cholesterol levels respond with a reduction in LDL-C and TC in response to plant sterols. However, TT homozygote carriers show no such beneficial reductions.

In addition, research has associated this genetic variation with the ability to predict increases in LDL-C and TC in response to dairy consumption with G allele carriers showing increased absorption of TC and LDL-C from the small intestine.

From a nutritional perspective it could be relevant to know how likely a nutritional protocol designed to optimise LDL-C levels using plant sterols may be effective genetically. Alongside this, G allele genetic variants of CYP7A1 may also be sensitive to increased total cholesterol and LDL-C when including dairy in their diet.



APOE3:4 genotype - Elevated

Your Result

You have one copy of the APoE4 genetic variant which is associated with late-onset Alzheimer's disease (AD), the most common form of neurodegenerative disorder, and cardio vascular health conditions.

Risk for developing AD involves multiple genetic and environmental components, with APoE4 genotype having the strongest genetic effect. Research has shown that the APoE4 variant of the gene raises the risk of developing AD by threefold if a person inherits one copy and up to 15 times if they have two copies of the gene. However, research also points to the fact that people who do not smoke, are physically active, only consume alcohol in moderation, and follow a healthy diet are at a lower risk. Therefore, having the genetic variant does not mean that you will get these diseases; other things such as environment and diet also plays a role.

Everyone inherits two APoE genes, one from each parent. Therefore it is possible for you to have one of the following six combinations or genotypes, E2/E2 (1%), E2/E3 (11%), E2/E4 (2%), E3/E3 (61%), E3/E4 (23%), E4/E4 (2%), with the figures in brackets indicating approximately what proportion of the UK population have the combinations.

Important! This test does not diagnose Alzheimer's disease or any other health conditions. Many factors, including genetics, can influence a person's chances of developing the condition. This test includes the most common genetic variant associated with late-onset Alzheimer's disease.

Important! Please talk to a healthcare professional if any of these conditions runs in your family, you think you might have one of these conditions, or you have any concerns about your results.



Lifestyle Interventions

What to do

Suggested lifestyle and dietary interventions

To help reduce this risk, it's very important for you to make some lifestyle changes.

- You should minimise sugar consumption, remove trans fats and limit saturated fat intake and focus on eating healthy fats.
- Try to increase antioxidants which can be obtained from the diet, and the recommendation is to eat at least five portions of colourful fruit and vegetables per day. Try to eat a rainbow of different colours daily.
- Try to reduce inflammation and toxins including those found in cigarettes and alcohol.

- Eat plenty of green leafy vegetables.
- Include whole grains as part of a healthy balanced diet.
- Include regular exercise.

More Information

Biological explanation

Mutations in the amyloid precursor protein (APP), presenilin 1 (PSEN1), and presenilin 2 (PSEN2) genes can cause early-onset Alzheimer disease, although this accounts for a small percentage of cases. Most dementia cases occur sporadically in older adults in whom multiple genes influence risk. The ϵ 4 allele of the apolipoprotein E gene (APOE) is known to increase the risk of Alzheimer disease.

The APOE gene contains instructions for making a protein called apolipoprotein E. This protein helps control the levels of cholesterol and fats in the blood. It is not known exactly how the ϵ 4 variant increases the risk of late-onset Alzheimer's disease. The variant tested is a change from a T to a C in the DNA sequence of the APOE gene. Two genetic markers (rs429358 and rs7412) in the APOE gene are often used together to define three variants of the APOE gene called :2, :3, and :4.

Limitations

- This test includes the most common genetic variant associated with late-onset Alzheimer's disease.
- This test does not include all possible variants or genes associated with late-onset Alzheimer's disease.
- This test does not include any variants or genes linked to early-onset Alzheimer's disease.

Late-onset Alzheimer's disease

Late-onset Alzheimer's disease is the most common form of Alzheimer's disease, typically developing after age 65.

Heart Health

Many studies have investigated the relationship between cardiovascular risk factors and Alzheimer's disease. Evidence suggests that factors which increase the risk of cardiovascular disease (obesity, high cholesterol, and high blood pressure) also increase the risk of Alzheimer's disease in older age. Having type 2 diabetes has also been linked to increased risk of developing both cardiovascular disease and Alzheimer's disease.



Hemochromatosis risk - Typical

Your Result

According to the two genetic variants analysed, you do not appear to have an increased risk of hemochromatosis.

Your Genetic Variants



HFE C282Y

Not a carrier of the risk allele.

Human hemochromatosis (HFE) gene contains instructions for making a protein that helps control the amount of iron absorbed by the body. Certain variants in the gene disrupts the ability of the HFE protein to regulate iron absorption, causing too much iron to be absorbed. This can lead to Hereditary Hemochromatosis. Two common genetic variations associated with hemochromatosis are HFE C282Y and HFE H63D.

Important! Please note that having the genetic variants does not mean that you will have a problem with your iron level; other things such as environment, diet, and other genes may come into play. If you do have the genetic variants or concerned about your iron levels then please discuss with your healthcare professional.



HFE H63D

Not a carrier of the risk allele.

Human hemochromatosis (HFE) gene contains instructions for making a protein that helps control the amount of iron absorbed by the body. Certain variants in the gene disrupts the ability of the HFE protein to regulate iron absorption, causing too much iron to be absorbed. This can lead to Hereditary Hemochromatosis. Two common genetic variations associated with hemochromatosis are HFE C282Y and HFE H63D.

Important! Please note that having the genetic variants does not mean that you will have a problem with your iron level; other things such as environment, diet, and other genes may come into play. If you do have the genetic variants or concerned about your iron levels then please discuss with your healthcare professional.

Lifestyle Interventions

If you are concerned about your iron levels, then please discuss with your healthcare professional.

Risk for hemochromatosis

Iron is an essential nutrient found in many foods, this trace metal carries oxygen to all parts of the body. In addition, iron helps to control cellular redox potential, maintenance of energy metabolism, oxidative stress and DNA synthesis. Systemic iron abundance and location is tightly controlled by the liver and normally, we absorb about 8-10% of the iron in foods that we eat. This tight regulation is due to our kidneys having no excretory function for iron and excessive amounts of iron will cause production of reactive oxygen species damaging tissues. Hereditary hemochromatosis is a genetic disorder in which a person may absorb up to four times more iron than normal. This may lead to iron accumulation in the body and symptoms of iron overload such as liver cirrhosis, type 1 diabetes, joint pain, fatigue and hypermelanotic pigmentation.

The Human Hemochromatosis Protein (HFE) is located on the surface of cells, primarily liver and intestinal cells and is also found on some immune system cells. The HFE protein regulates the production of another protein called hepcidin, which is considered the “master” iron regulatory hormone. Hepcidin is produced by the liver, and it determines how much iron is absorbed from the diet and released from storage sites in the body. When the proteins involved in iron sensing and absorption are functioning properly, iron absorption is tightly regulated. The HFE protein also interacts with two proteins called transferrin receptors; however, the role of these interactions in iron regulation is unclear.

Two common genetic variations associated with hemochromatosis are HFE C282Y and HFE H63D. Please note that having the genetic variants does not mean that you will have a problem with your iron level; other things such as environment, diet, and other genes may come into play.

Age: Iron takes time to build up in the body. Therefore, symptoms of iron overload are most often diagnosed in men between the ages of 40 and 60, and in women after the age of 60.

Alcohol consumption: Excessive alcohol consumption can lead to liver disease. In people with hemochromatosis, the liver is already at risk for damage from iron overload. For these individuals, the risk for liver damage is further increased with excess alcohol consumption.

Diet: Iron is an essential nutrient that the body needs to function properly. However, consuming foods high in iron or taking certain supplements can increase the amount of iron stored in the body for people with hemochromatosis which may increase the chances of developing symptoms of iron overload. Consult with a healthcare professional before making any major dietary changes.



Antioxidants - Moderate

Your Result

The body has a wide range of antioxidant defence systems which come from either endogenous (made in the body) systems or exogenous (absorbed by the body) systems. Your score has taken into account some of these defence systems and is by no means a comprehensive analysis.

You can provide some protection from free radicals and other types of oxidative stress by consuming dietary antioxidants.

Your Genetic Variants



GSTM1

A GSTT1 deletion (absent) is not functional meaning a reduced ability to process vitamin C which may impact how your body clears toxins from the body.

GSTT1 is a member of the GST super-family and catalyze the conjugation of reduced glutathione to a variety of electrophilic and hydrophobic compounds. The GSTT1 gene can exist in one of two forms: the present (insertion) form is considered functional while the absent (deletion) form is not functional.

The different forms of the gene interact to influence the way vitamin C is utilised in the body. Vitamin C serves as an antioxidant, in addition to other vital roles, which helps to reduce damage caused by free radicals and low blood levels are associated with an elevated risk for conditions such as cardiovascular and type 2 diabetes.



GSTT1

You are able to use this enzyme successfully to clear hormones like oestrogen and heavy metals like lead, cadmium, mercury and aluminium. If overexposed to toxins you can still exhaust this cleansing system.

GSTM1 is the most biologically active member of the **Glutathione S-transferase (GST)** gene super-family and is involved in Phase II detoxification in the liver. It is responsible for the removal of xenobiotics, carcinogens and products of oxidative stress.



MnSOD

The C allele increases the risk of developing certain cancers if the diet is low in fruits and vegetables. Those with the C allele should ensure adequate antioxidant intake.

MnSOD gene encodes manganese superoxide dismutase, an important antioxidant enzyme. This enzyme is an important first step in a pathway to remove free radicals produced as a natural by-



product of energy production pathways found in the majority of cells in the body. Free radicals can cause damage to cellular structures and processes so it is important to have effective mechanisms to remove these. A variant of this gene has been associated with a change in the structure of this enzyme and its efficiency.



NQO1

CC indicates no impact.

NAD Quinone Oxidoreductase type 1 (NQO1) is an important enzyme with a wide range of biological functions, including the maintenance of appropriate redox levels in cells and detoxification of certain xenobiotics and carcinogens.

A genetic variant causes a change to the protein structure and leads to reduced NQO1 enzymatic activity. This reduced antioxidant capacity has been associated with increased homocysteine levels in cardiovascular disease and when exposed to pollution a lack of tolerance to benzene compounds and cancer susceptibility.

Lifestyle Interventions

What to do

If you have the genetic variants and are not consuming enough antioxidants, or if you are inflamed, then you may be more susceptible to rapid ageing, hypertension and cardiovascular problems. This can be supported through consuming antioxidant rich nutrients.

Effects of antioxidants

All of us need to get more antioxidants in our diets. This can help to inhibit the oxidation of vital molecules in your cells. Your body's cells naturally produce some powerful antioxidants, such as alpha lipoic acid and glutathione. The foods you eat supply other antioxidants such as vitamins A, C and E, selenium and co-enzyme Q10.

Vitamin A helps to power your eyesight, especially your night vision, and keeps your skin, gums, and teeth healthy. It also boosts your immune system and helps fight off viruses. The older you get, the more you seem to need of it. Betacarotene is a precursor to vitamin A (retinol).

Betacarotene food sources: Carrots, squash, pumpkin, spinach, broccoli, tomatoes, melons, peaches, apricots, and sweet potatoes.

Vitamin C helps to capture the free radical and neutralises it. Vitamin C helps to strengthen the immune system and fights infections. It makes collagen, keeping bones, skin, and joints firm and strong.

Food sources: Citrus foods, bell peppers, cabbage, spinach, broccoli, kale, watercress, tomatoes, melons, kiwi and strawberries.

Vitamin E is an antioxidant which helps to protect your cells, helps them to communicate with one another, and defends your skin against UV damage. Vitamin E also helps to protect fats such as cholesterol from being damaged within the arteries.

Food sources: Nuts, seeds, beans, fish oils, wheat germ, and sweet potatoes.

Selenium is a protective mineral against free radicals and carcinogens.

Food sources: Tuna, cod, herring, chicken, oysters, molasses, mushrooms, cottage cheese, cabbage and liver.

Co-enzyme Q10 (CoQ10) improves energy, augments the immune system, and studies have now shown that CoQ10 has an ability to improve heart function. CoQ10 can be made by the body, although not in sufficient amounts for optimum health and energy, thus supplementation is often recommended to achieve optimum levels.

Food sources: Sardines, mackerel, pork, spinach, soya oil, peanuts, sesame seeds and walnuts.

What is oxidative stress?

Did you notice that when you slice an apple, the white bits start turning brown or a small cut on your finger gets swollen and irritated? All of these are a consequence of oxidation and is a natural process that happens to all living cells in nature, including the cells in your body.

This oxidative damage or stress is the common denominator in the process of ageing. Oxidative stress is what happens when your body does not have enough antioxidants to neutralise free radicals, the unstable molecules that react with other substances in your body to damage cells or create abnormal ones. This cellular damage can trigger inflammation, arterial damage, and ageing. Common health conditions are becoming more associated with a shortage of antioxidant nutrients in the body.

Genetics and environmental factors

Both contribute to oxidative stress. Antioxidants are found naturally in the body in the form of enzymes but certain genetic variants can impact enzyme activity. Therefore, some people will need to increase their intake of dietary antioxidants.



Your Result: Aerobic Exercise

According to your results, you are genetically better suited for aerobic/ cardio exercises and you may enjoy this type of exercise more.

Aerobic or Cardiovascular exercise is endurance or aerobic and simply means that you are involved in an activity that raises your heart rate to a level that you are working, but can still talk i.e. in your "target heart rate zone".

Cardiovascular exercise (endurance or aerobic)

Cardiovascular refers to the ability of your heart, lungs and organs to consume, transport and utilise oxygen. The maximum volume of oxygen your body can consume and use is your VO2max. When you exercise regularly, you can increase your cardiovascular fitness as your heart becomes more efficient at pumping blood and oxygen to the body and the body becomes more efficient at using the oxygen.

Genetically you may be suited for aerobic exercise which is sometimes known as "cardio". This type of exercise requires pumping of oxygenated blood by the heart to deliver oxygen to working muscles. Aerobic exercise stimulates the heart rate and breathing rate to increase in a way that can be sustained for the exercise session.

Examples of aerobic exercises include cardio machines, spinning, running, swimming, walking, hiking, aerobics classes, dancing, cross country skiing, and kickboxing. There are many other types.

Benefits of cardiovascular exercise

- Helps you sleep better and reduces stress
- You burn calories and lose weight
- Makes your heart strong so it does not have to work so hard to pump blood
- It increases lung capacity
- It decreases the risk of heart attack, high cholesterol, high blood pressure, and diabetes
- Makes you feel good

You need cardiovascular exercise if you want to get your weight under control and get your stress to a tolerable level.

How to be more active

Try to get a weekly total of at least 150 minutes of moderate aerobic activity or 75 minutes of vigorous aerobic activity or a combination of the two over at least three days per week in sessions of least 10 minutes each.

Plus you need to fit in at least two days per week for muscle strengthening for additional health benefits.

Try these tips

- **Schedule:** Break your exercise into easy daily amounts. Try at least 30 minutes of activity 5 days a week, or 22 minutes everyday.
- **Set goals:** Set realistic goals and make small, lasting changes to set yourself up for success.
- **Keep going:** Once you reach these goals, don't stop. Gradually increase your activity to gain even more health benefits.
- **Walk more:** There are many ways to get active. Walking more is a simple, positive change you can make to improve your health.

More Info

Getting started with aerobic exercise

Note: Please discuss this training with your personal trainer or health club professional.

Monitoring your exercise intensity is the best way to get the most out of your cardio workouts. The target heart rate calculator is one way to make sure you are working within your target heart rate zone, the most effective zone for improving fitness and burning calories.

You can use a heart rate monitor during workouts or take your pulse for 6 seconds, count how many times your heart beats and add a zero to get an estimate.

Tip: If you don't know what you like, try something and if it does not work for you then try something else. Just about any activity will do, as long as it gets your heart rate into your target heart rate zone.

For example:

- Outdoors - running, cycling, hiking and walking, using a trampoline, skipping (using a jump rope)
- Gym - swimming, stationary bike, elliptical trainers, treadmills, rowing machines and stair master
- Other - dancing, climbing up stairs and all kinds of aerobic exercise, which can be done in a aerobic class or even following a DVD.

Beginners or new to exercise - 6 week jumpstart workout program

If you're ready to jumpstart your body, this 6 week exercise program helps to ease into exercise with simple, effective workouts.

- **Frequency:** Try to build to at least 30 minutes of activity 5 days a week, or 22 minutes everyday.
- **Duration:** Start with 10 minutes and work up to 30 minutes.
- **Intensity:** It is more important to work on continuous exercise than to worry how fast you are going or how hard you are working.
- **Exertion level:** Level 5-6; above comfortable, you are sweating and feeling slightly breathless.

Intermediate to advanced

This is only for people who exercise regularly and are fit. It is not for beginners or people with cardiovascular problems or health risk problems.

- **Frequency:** To lose weight, 4 or more days per week with a minimum 30 minutes per session. To maintain fitness, 2 to 4 days per week at least 20 minutes per session
- **Duration:** 20- 40 minutes
- **Intensity:** Keep the heart-rate in the target heart-rate zone
- **Exertion level:** Level 7-8; work as hard as you can until you feel your muscles burning.



Your Recommended Diet: Reduced Carbohydrate Eating Plan

Our nutritionist has recommended a Reduced Carbohydrate dietary approach due to your genetic predisposition for impaired sugar metabolism. The dietary guidelines are designed to help you remove added sugars and refined carbohydrates from the diet in order to maintain an even blood sugar level. In addition, ensure adequate intake of protein alongside the lower 'sugary' carbohydrates at meal times.

Your overall results also shows that you may become sensitive to some fats. You can lower your risk through adopting a healthy fat eating lifestyle with exercise.

Your genetic profile and clinical questionnaire indicate that you over-absorb sugar and struggle to metabolise sugars correctly, resulting in weight gain. You particularly have the genetic profile that does not do well on refined carbohydrates (bread, pasta, pizza, cakes, etc). Continued over-consumption of sugar, sweet foods and refined carbohydrates can result in worsening weight gain and eventual heart problems and sugar diabetes.

Your recommended diet is a reduced carbohydrate eating plan as you are predisposed to have a high blood sugar level, which leaves you susceptible to premature sugar damage of the body. By cutting out the high-sugar carbohydrate foods and eating low-sugar carbohydrates, proteins and healthy fats, you should be able to move towards optimal wellness for you.

The information below will provide you with the dietary guidelines, which include foods to eliminate in your diet.

Good vs Bad Carbs explained

Carbohydrates or 'carbs' are one of three essential macronutrients (the other two are fats and proteins) and usually are the body's favoured energy source, providing fuel for everyday activities. However, not all carbohydrates are created equal. Carb intake has become controversial these days and there is a lot of information available, much of which splits carbs into good and bad. Let's have a look at these carbs and their health effects which will allow you to make good choices.

"Good" or whole carbs are foods which are minimally processed and packed with natural vitamins and minerals. Sources include vegetables (squash, spinach, broccoli, cauliflower), legumes (such as beans and lentils) and fruit (lower sugar fruits like apples, pears, berries).

"Bad" or refined carbs are from foods like white bread, sugary fruits (peaches), sugar and sweets, pack lots of calories and have little nutritional value. They play havoc with blood sugar levels and result in the body storing them as fat.

Reduced carbohydrate eating supplies fewer carbs than The Eatwell Plate would suggest. While the government recommends that adults get about half of their calories from carbs, your particular genetic sensitivity to carbohydrates means that you may need to reduce your carbs below the standard recommendations. This reduced carbohydrate eating plan will provide reduced amounts of daily calories from carbs, focusing on healthy whole carb sources.

What is dietary Fat?

Fat is an important part of our diet and are made of the same base molecules of carbon and hydrogen but put together in different ways to create different types of fat. The arrangement of the molecules in fat also determines how beneficial the type of fat we eat are for our health. Therefore it can be important to make sure we are consuming the optimal types of fat in our diet, especially if predisposed to sensitivity to some fats.

Fats in our food fall into 2 main types which are easily distinguished: Saturated fats are generally solid at room temperature and Unsaturated which tend to be liquid at room temperature. Unsaturated Fats are then split into either monounsaturated or polyunsaturated. Another layer of complexity is added to our modern diet due to processing of food which changes the chemical structure of the fat we eat and the impact these have on our body.

Saturated fats: These can be split into processed and unprocessed.

Processed saturated fats are also known as "Trans Fats" and should be completely avoided. Trans fats are created when certain fats and oils are heated in industrial processing in the presence of hydrogen gas. This has been popular in the food industry as it makes the fats more stable and have a longer shelf-life. Research has now established that trans fats are detrimental to our health and have been associated with health issues like coronary heart disease, asthma and arthritis. Products which may contain trans fats include margarine and processed foods such as crisps, pastries, fries and biscuits.

Unprocessed saturated fats are those naturally found in both animal and plant foods. The majority are found in animal foods such as beef, lamb, chicken, pork and dairy products. Some plant foods such as coconut, palm oil and peanuts also contain saturated fats. Fat is an important part of our dietary intake for maintenance of body tissues such as our nervous system and also to ensure we are able to absorb certain vitamins which are fat-soluble. However, this type of fat should be limited in our daily intake of food as over consumption can lead to excess fat storage and interfere with metabolism of more beneficial fats such as omega 3. Switch to wild game or free-range meat which has less saturated fat than farmed meat.

Unsaturated fats: These can be split into Monounsaturated and Polyunsaturated

Monounsaturated fats are considered to be healthier for us as research has established they can improve blood lipid profiles and reduce inflammation. Good sources are olive oil (particularly extra-virgin), avocados, most nuts, as well as pumpkin and sunflower seeds.

Polyunsaturated fats can also be split into unprocessed and processed. The act of processing polyunsaturated fats changes their molecular make up and has profound effects on our health when consumed. Hydrogenated vegetable oils are created when vegetable and seed oils are heated in industrial processing in the presence of hydrogen gas. This includes processed vegetable oil often used for cooking and should be avoided altogether. Unprocessed polyunsaturated fats include beneficial omega 3's which are an essential part of the diet as we are unable to make them ourselves. The health benefits of these anti-inflammatory fats are far reaching such as reduced risk of heart attack and osteoporosis, better mental stability and even better protection from sunburn. These fats are found in good quantities in cold pressed flaxseed and oily fish such as mackerel, salmon and sardines.

What to eat

On this eating plan you will cut out the sugary carbs and stick to eating a balance of quality proteins, non-starchy vegetables and clever carbohydrates with moderate levels of beneficial ideal fats.

Quality Proteins

- **Meat:** Beef, lamb, pork, venison, wild game. Preferably organic, free range or grass-fed.
- **Poultry:** Chicken, duck, eggs, ostrich, turkey, . Preferably organic, free range or grass-fed.
- **Fish:** Bass, hake, halibut, herring, mackerel, salmon, sardines, trout, tuna (limit tuna to one portion per week).
- **Seafood and Shellfish:** Calamari, clams, crab, crayfish, lobster, mussels, oysters, prawns and shrimp.
- **Dairy:** Milk, cottage cheese, plain natural yoghurt, plain Greek yoghurt, protein powders (whey and casein). Choose low fat / higher protein varieties.
- **Plant-Based:** Beans, chickpeas, lentils, peas, pulses, protein powders (rice, hemp, soy, etc), tofu, tempeh, edamame.

Non-Starchy colourful Vegetables

- **Red: Red chard,** Red onions, red peppers, radishes, radicchio, rhubarb, tomatoes.
- **Yellow / Orange:** Carrots, yellow / orange peppers, sweetcorn, turmeric root, yellow tomatoes.
- **White / Brown:** Cauliflower, fennel, garlic, ginger, mushrooms, onions.
- **Purple: Aubergines, black olives, purple sprouting broccoli, purple carrots,** red cabbage.
- **Green:** Artichokes, asparagus, broccoli, Brussel sprouts, celery, courgette, cucumber, green beans, green peas, leafy greens (kale, spinach, collards, etc), leeks, lettuce, peppers (green), okra, sugar snap peas.

Clever Carbohydrates

- **Starchy Vegetables:** Butternut squash, parsnips, potatoes, pumpkin, sweet potatoes, swede, turnips.
- **Whole Grains:** Barley, buckwheat, oats (steel cut or rolled), quinoa, rice (brown, red or wild), sorghum, spelt, sprouted grains or breads, wheat berries.

Extra Fat advice is to choose only ideal fats in moderation:

- **Cold-Pressed Oils:** Avocado oil, coconut oil, fish oil, flax seed oil, hemp seed oil, olive oil, walnut oil.
- **Nuts (raw):** Almonds, Brazil nuts, cashews, hazelnuts, macadamias, pecans, pine nuts, walnuts.
- **Seeds (raw):** Chia seeds, flax seeds, hemp seeds, pumpkin seeds, sesame seeds, sunflower seeds.
- **Other:** Avocado, butter and ghee, coconut, non-dairy milks (coconut, almond, soy, etc), nut butters (almond, macadamia, etc), olives, peanuts, peanut butter (unsweetened).

Avoid

- Processed Foods (packaged and canned)
- Ready meals
- Fast Foods
- Farmed fish and shellfish
- Swordfish
- Soft Drinks
- Added sugar (sucrose, fructose and glucose)
- Artificial Sweeteners
- Cooking at high temperatures
- Refined white carbohydrates such as pasta and white-bread
- Fruit juices
- Trans fats
- Large amounts of saturated fats
- Margarines

- Cooking with non-stick pans
- Pesticides (choose organic where possible and make sure to wash produce before consumption)
- Foods containing preservatives and colourings
- Consuming unfiltered water
- Food and beverages packaged in plastic (including oils)
- GM foods
- Processed fats and oils such as: canola, cottonseed, corn, grapeseed, safflower, soybean, sunflower and vegetable (including shortening)
- Alcohol - above recommended limits

Disclaimer

This report is for information purposes only and is not intended to be used as medical advice. The information in this report is not intended to treat, diagnose or cure any medical condition or disease. Clients with medical conditions should not change or stop their medications or medical care without consulting with their medical professional first. The information in this report is not intended for children or for women who are pregnant or nursing.

The Lifestyle Assessment Report results are based on the answers to the self-assessment questionnaires that were completed by you.

Any assertions or suggestions in the report as to nutritional supplements, exercise or diet, whether specific or general, are based on the following assumptions that:

- You are in a good state of health and do not have any medical problems that you are aware of;
- You have not had any recurring illness in the past 12 months;
- No medical practitioner has ever advised you not to exercise;
- No medical practitioner has ever advised you to follow a strict diet due to a medical condition or serious illness;
- You are not on any prescribed medication that may affect your ability to exercise safely or to diet or to take nutritional supplements;
- You do not have any food allergies; and
- There is no other reason why you should not follow the suggestions in the Lifestyle Assessment Report.

The information provided by My DNA Health Limited is neither exhaustive nor absolute, and may not be applicable to individual circumstances should the information be subsequently deemed inaccurate or out of date by virtue of new scientific advances. Once your report is provided to you, there will be no further information, feedback, or updates provided to you unless you conclude a separate arrangement for an update regarding new developments.

If you have any concerns at any time about whether or not these assumptions are correct in your particular circumstances, before acting, or not acting, on any of the assertions or suggestions, you must consult a medical practitioner.

You are at all times responsible for any actions you take, or do not take, as a consequence of the assertions or suggestions in the Lifestyle Assessment Report, and you will hold My DNA Health Limited, its officers, employees and representatives harmless against all losses, costs and expenses in this regard. Before acting on any of the assertions or suggestions in the Lifestyle Assessment Report, you must consult your nutritional or healthcare practitioner.

If you have any questions, please ask your registered nutritional or healthcare professional to contact us at customersupport@mydnahealth.co.uk.

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