Lifecode GX ®
— Professional Genotype Analysis —

Nutrient Core Report

Sample

Welcome to your unique, personalised Nutrient Core DNA report!

DNA sequencing has opened the door to personalised, preventive and proactive approaches to health and wellbeing. In this report we present elements of your unique DNA profile that have been shown to affect your:

- **food response** - gluten, lactose, caffeine and microbiome diversity
- **vitamin need** - vitamins A, B9 (folate), B12, C, D, K and glutathione
- **metabolism** - sugar and fat, appetite, inflammation, blood pressure and circadian rhythm

The nutritional genomics team at Lifecode Gx are experts in interpreting DNA results, examining the most up to date research in the field and distilling it into relevant, meaningful and practical advice. To get the most benefit from this report we recommend that you work with a qualified nutrition professional.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Lactose Intolerance

The LCT gene controls levels of an enzyme called lactase which is needed to digest the sugar and lactose found in milk. It is produced on the surface of the microvilli in the small intestine.

Historically the LCT gene would have been active for the first few years of a person's life, after which there would be no need to be able to digest large quantities of milk. However, in some populations, particularly Caucasians, a common genetic variance that promotes lactase production enables individuals to continue to digest milk throughout their life.

The most common symptoms of lactose intolerance are diarrhoea, gas, bloating, abdominal pain or cramping, nausea or vomiting and headaches or migraines. These signs can arise between thirty minutes and two days after the consumption of dairy products and can range from mild to severe.

Nutrition Advice

If you are lactose intolerant you should minimise or avoid milk, cheese, yoghurt and butter. You are advised to consult with a health professional before excluding any major food groups from your diet.

Your Results

LCT GA

Tolerant. Likely to be able to digest lactose in milk and other dairy products without experiencing uncomfortable side effects.

You may still experience adverse responses to dairy products for other genetic or environmental reasons.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Celiac Disease

The proteins produced from human leukocyte antigen (HLA) genes help the immune system distinguish the body's own proteins from those made by foreign invaders, such as viruses and bacteria.

Variants on HLA genes are associated with auto-immune conditions including celiac disease, which is an inability to digest gliadin, the component of gluten found in wheat, rye and barley.

Eating foods containing gluten can trigger many obvious symptoms such as diarrhoea, abdominal pain, bloating and flatulence, indigestion, constipation but also less known symptoms including iron-deficiency anaemia, chronic fatigue, joint pain and inflammation, migraines and vitamin deficiencies.

If you experience symptoms and/ or have a family history of celiac disease or other autoimmune conditions speak to a health professional about testing for celiac disease associated antibodies - tTG (tissue transglutaminase) IgA and IgG - and for intolerances to other foods. A small-bowel biopsy or improvement on a gluten free diet may be used to diagnose or rule out celiac disease.

Nutrition Advice

Celiac disease can be managed by adherence to a strict gluten-free diet - avoidance of wheat, rye and barley; and treatment of nutritional deficiencies such as iron, zinc, calcium, fat-soluble vitamins and folate.

People who do not have celiac disease may experience gluten sensitivity resulting in similar symptoms.

Your Results

HLA-DQA1 CC

Lowest Risk. Not associated with risk of celiac disease or gluten intolerance. If your rs7454108 result is also wild type, the risk of celiac disease is almost non-existent.

You may still experience symptoms of gluten intolerance for other reasons. A nutrition specialist will be able to advise you how to adjust your diet safely.

HLA-DQB1 TT

Lowest Risk. Not associated with risk of celiac disease or gluten intolerance. If your rs2187668 result is also wild type, the risk of celiac disease is almost non-existent.

You may still experience symptoms of gluten intolerance for other reasons. A nutrition specialist can advise you how adjust your diet safely.

For a deeper analysis of genes that impact autoimmunity we recommend the Thyroid Balance report.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Microbiome

The FUT2 gene regulates the secretion of H and AB blood group antigens on the surface of epithelial cells, including those lining the gut. FUT2 variants determine Secretor (with antigens) or Non-Secretor (without antigens) status. The relevant variant differs according to ethnicity (see genetic results below). There are pros and cons associated with each Secretor and Non-Secretor type.

A Secretor is likely to have more Bifido bacteria (the friendly ones) in their microbiome. In addition, the breast milk of a Secretor contains 2'-FL sugars which stimulate the growth of protective Bifido bacteria in the infant's microbiome. However, Secretors are more at risk of H. pylori infection and less efficient absorption of vitamin B12.

The microbiome of a Non-Secretor is likely to be less diverse with fewer Bifido bacteria. The breast milk of a Non-Secretor contains 3'-FL sugars, instead of the beneficial 2'-FL sugars. However, non-Secretors have lower risk of H. pylori infection, absorb vitamin B12 more efficiently and are resistant to Norwalk/ 'cruise ship' virus, as the virus needs antigens to bind to.

The colonisation of our microbiome affects many aspects of human health. Lack of diversity or insufficiency of friendly gut bacteria can contribute to gastro-intestinal tract issues, mental illness, poor nutrient status, autoimmune disease, weight gain and skin conditions.

Nutrition Advice

Fermented foods such as kimchi, sauerkraut and kefir encourage good bacteria to flourish. Multi-strain probiotic supplements are also beneficial. Antibiotics and NSAIDs (non-steroidal anti-inflammatory drugs) like ibuprofen have a negative affect on microbiome diversity.

Your Results

FUT2 [redacted] AA

Good Diversity. Secretor genotype (Asian populations). A Secretor genotype is likely to have more Bifido bacterium in the gut, which is also beneficial for infant microbiome population. Lower risk of celiac disease and other autoimmune conditions. More susceptible to H. pylori infection and gastritis, and reduced B12 absorption.

FUT2 [redacted] AG

Good Diversity. Secretor genotype (non-Asian populations). A Secretor genotype is likely to have more Bifido bacterium in the gut, which is also beneficial for infant microbiome population. Lower risk of celiac disease and other autoimmune conditions.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Caffeine

Caffeine is a central nervous system stimulant used extensively as a legal and safe performance booster. It stimulates adrenaline and dopamine release, increases alertness, focus and pain tolerance, and reduces fatigue. It also promotes lipolysis (break down of fats) and increases metabolism. Caffeine can also cause negative effects including sleep disruption, spikes in heart rate and anxiety.

Natural sources of caffeine include coffee beans, tea, cocoa beans and cola nuts. It is also found in some pharmaceutical products, carbonated drinks and energy drinks.

Peak blood levels of caffeine are experienced about 1-2 hours after ingestion. The half-life (time taken to eliminate half a dose) of caffeine is typically 3-7 hours. The rate of caffeine metabolism is increased up to 2x by smoking, and decreased up to 2x in pregnancy and by oral contraceptive or antidepressant use.

Caffeine is metabolised in the liver by the cytochrome P450 oxidase enzyme system. CYP1A2 is the main deactivator (detoxifier) of caffeine. Variants on this gene increase its activity so caffeine is metabolised more quickly, reducing the duration of effect.

Adenosine, a by-product of energy release, interacts with the ADORA2A receptor gene to inhibit dopamine. This is a reason why people feel more tired after exercise and later in the day. Caffeine inhibits ADORA2A which frees up dopamine to exert its stimulatory effects.

ADORA2A genetic variants increase sensitivity to caffeine which means that small amount of caffeine can have a significant stimulatory effect.

Nutrition Advice

To enjoy the benefits of caffeine without experiencing adverse effects, consider factors such as body size, habitual caffeine intake and timing, overall toxic load (on the liver), and genetics.

Your Results

ADORA2A CC

Significantly increased sensitivity to caffeine - which means you may experience significant effects from low doses.

Be aware of total caffeine load from food and drinks including coffee, tea, carbonated drinks and chocolate.

CYP1A2 AA

The AA genotype is associated with relatively fast metabolism of caffeine, and may be able to tolerate higher caffeine without experiencing negative effects.

Limit total load of caffeinated food and drinks including coffee, tea, carbonated drinks (especially 'energy drinks'), and chocolate later in the day.

To discover more about the effects of caffeine we recommend the Nervous System report.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Vitamin A

Vitamin A is a fat-soluble vitamin which is important for immune system health, fetal development, and vision. There are two major types of vitamin A: carotenes from fruit and vegetables, and retinoids (retinol, retinal and retinoic acid) from animal products.

Beta-carotene, also known as provitamin A, can be converted to biologically active retinoids by the BCO1 gene. Variants on the BCO1 gene can reduce someone's ability to convert beta-carotene by more than 50 percent. As well as functioning as provitamins, beta-carotenes have powerful anti-inflammatory and antioxidant properties.

Retinol is the biologically active form of vitamin A which is needed to support retinal function, and healthy vision. It can be converted to retinal and subsequently to retinoic acid, which regulates activity of other genes.

The most common symptom of vitamin A deficiency is night blindness, where people are unable to see well in dim light. Vitamin A deficiency can also increase susceptibility to infections, and to thyroid and skin disorders.

Overconsumption of preformed vitamin A (retinoids), from animal sources, can cause vitamin A toxicity.

Nutrition Advice

Beta-carotene is found in orange and green vegetables including carrots, pumpkins and spinach. Carriers of BCO1 gene variants, who are likely to be poor converters, will benefit from consuming preformed vitamin A found in liver, fish oils and dairy foods.

Your Results

BCO1 [redacted] TA

Poor Converter. Reduced ability to convert beta-carotene to retinol. Increased need for preformed vitamin A as retinol found in organ meats, such as liver, fish oil, eggs and milk.

BCO1 [redacted] TC

Poor Converter. Reduced ability to convert beta-carotene to retinol.

Increased need for preformed vitamin A as retinol found in organ meats, such as liver, fish oil, eggs and milk.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

B Vitamins

B vitamins are water-soluble vitamins that play important roles in cell function. Each B vitamin is either a cofactor or precursor for making or activating other substances.

Folate is the generic term for both natural folate, derived from foods, and synthetic, folic acid, used in dietary supplements. Vitamin B12 also exists in several forms, some of which need to be activated in order to have an effect.

Both folate and B12 availability can be significantly impacted by genetics. The FUT2 gene (Secretor type) is associated with poor absorption of B12 and lower levels, and variants on the TCN2 (Transcobalamin 2) gene can slow down the transport of B12 into cells. The MTHFR gene controls the only route for converting folate to active methyl-folate and genetic variants can slow this process by up to 70 percent.

Insufficiency of methyl-folate or methyl-B12 can impact conversion of homocysteine to methionine and synthesis of SAMe, the master methyl donor. These disruptions can contribute to developmental disorders, cardiovascular disease, neurological conditions, chronic fatigue, and free radical damage.

Nutrition Advice

Folate is found naturally in a wide variety of foods, including vegetables, especially dark green leafy ones, fruits and fruit juices, nuts, beans, peas, dairy products, poultry and meat, eggs, seafood, and grains. Vitamin B12 is found in animal products, including fish, meat, poultry, eggs and milk products. Vegetarians and vegans may benefit from supplementation as vitamin B12 is generally not present in plant foods.

Your Results

FUT2 [redacted]	AA	Low Absorption. Secretor genotype (Asian populations). More susceptible to H. pylori infection and gastritis, and reduced B12 absorption.
FUT2 [redacted]	AG	Low B12 absorption. Secretor genotype (non-Asian populations). More susceptible to H. pylori infection and gastritis, and reduced B12 absorption.
MTHFR [redacted]	AG	Slow activation of folate. Up to 40% slower conversion of folate to methylated folate, which may reduce the supply of methyl-folate needed for synthesis of SAMe, and methylation in general. Ensure good intake of folate foods and co-factors magnesium and zinc. Methyl-folate dietary supplements may be beneficial.
TCN2 [redacted]	CC	No impact. Normal transport and delivery of vitamin B12 into cells.

To learn more about the effect of B vitamins we recommend the Methylation report and the Nervous System report.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Vitamin C

Vitamin C, also known as ascorbic acid, is a water-soluble vitamin. Unlike most mammals, humans cannot make vitamin C and must obtain it from the diet.

Vitamin C is an essential cofactor needed to make collagen - for healthy skin, blood vessels and cartilage; neurotransmitters - dopamine, noradrenaline and adrenaline; and carnitine - for mitochondrial energy production. It is a potent antioxidant, protecting against free radicals and reactive oxygen species (ROS). Vitamin C also improves intestinal absorption of non-heme iron found in plant based foods.

Severe vitamin C deficiency has been known for many centuries as the potentially fatal disease, scurvy.

Although severe deficiency is now rare, symptoms of vitamin C insufficiency such as poor wound healing and lethargy are common. Higher vitamin C intake may protect against cardiovascular disease, stroke and cancer.

The SLC23A1 gene is a transporter which supports the absorption of vitamin C and distribution to the rest of the body. A variant on this gene is associated with reduced activity and lower circulating levels of vitamin C. Carriers of SLC23A1 gene variants will benefit from higher intake.

Nutrition Advice

Good sources of vitamin C include citrus fruits (oranges and grapefruit), red and green peppers and kiwi fruit. It is also found in broccoli, strawberries and tomatoes.

Your Results

SLC23A1 CC

Normal. This genotype is associated with efficient transport of Vitamin C and up to 11 percent higher levels in circulation.

Ensure good intake of fruit and vegetables containing Vitamin C such as citrus fruits, tomatoes, potatoes, broccoli, strawberries and peppers.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Vitamin D

Vitamin D is a fat soluble vitamin which is best known for its role in bone health. It promotes calcium absorption in the gut and maintains serum calcium and phosphate concentrations needed to mineralise bone. Vitamin D is also involved in muscle metabolism, neurological function, cardiovascular health and immunity.

It is called the 'sunshine vitamin' because the body can make its own vitamin D when skin is exposed to sunlight. Whilst sunlight is the best source, vitamin D is also present in a few foods and can be obtained from supplements. Once in the body, vitamin D is converted to calcidiol and subsequently to calcitriol, the biologically active form.

Vitamin D deficiency can result in lower bone density, rickets, osteomalacia and osteoporosis. Other symptoms of vitamin D deficiency include muscle weakness, difficulty thinking clearly and unexplained fatigue.

Too much vitamin D can cause high blood concentrations of calcium, leading to over-calcification of bones, soft tissues, heart and kidneys.

Genetic variances can significantly impact vitamin D availability and response. The GC gene controls the supply of vitamin D Binding Protein (VDPR) which is important for transporting vitamin D in the circulation, actin scavenging (muscle recovery) and fatty acid binding. Variances on the VDR (Vitamin D Receptor) gene impact sensitivity to vitamin D and mediate various aspects of the immune system, dopamine synthesis and bone formation.

Nutrition Advice

The best food sources of vitamin D are oily fish, such as mackerel, salmon, tuna and sardines. Smaller amounts can be found in beef, pork, chicken, cheese, egg yolks and mushrooms.

Your Results

GG	Poor Transporter. Decreased circulation of vitamin D which may cause symptoms of vitamin D insufficiency.
CC	Good Sensitivity. Normal vitamin D receptor activity and response to vitamin D.
AA	Good Sensitivity. Normal vitamin D receptor activity and response to vitamin D.

To understand more about how Vitamin D can impact health we recommend the Thyroid Balance and Nervous System reports.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Vitamin K

Vitamin K is a group of fat-soluble vitamins required for blood coagulation (clotting) and, through its interaction with vitamin D, bone health. Naturally occurring forms of vitamin K include phylloquinone (vitamin K1) which is made by plants, and menaquinone (vitamin K2) found in animal livers and fermented foods. Bacteria in the gut flora are able to convert K1 into vitamin K2.

The body has limited ability to store vitamin K, and is reliant on recycling through a process called the vitamin K epoxide cycle. The VKORC1 gene enables the recycling of vitamin K epoxide (oxidised form) to hydroquinone (active form). Genetic variants on VKORC1 can disrupt the recycling of vitamin K and increase risk of deficiency.

Symptoms of vitamin K deficiency include anaemia, easy bruising and bleeding (nosebleeds, bleeding gums, blood in the urine or stool or extremely heavy menstruation), due to reduced blood clotting. In addition, increased arterial calcification can increase the risk of osteoporosis and cardiovascular diseases.

The anticoagulant drug warfarin works by inhibiting VKORC1 activity, reducing vitamin K availability and clotting ability. Individuals with VKORC1 variants should inform their health professional if anticoagulant drugs are suggested.

Nutrition Advice

Vitamin K can be found in dark green, leafy vegetables and brassica foods such as broccoli, Brussels sprouts and cabbage.

Your Results

VKORC1 CC

Normal. Normal recycling of inactive to active vitamin K. No impact on blood coagulation, bone strength or vascular health.

Vitamin K is found in large quantities in spinach, kale, cabbage, broccoli and Brussels sprouts. Vitamin K is more bioavailable when consumed with fats.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Glutathione

Glutathione has been called 'the mother of all antioxidants'. It helps prevent cellular damage caused by oxidative stress, pollutants, medication, heavy metals (mercury, lead and cadmium), alcohol and other toxic substances. Glutathione can also help recycle other anti-oxidants such as vitamin C.

As glutathione can be made in the body it is not, strictly speaking, an essential nutrient. In fact, as most dietary glutathione is destroyed in the gastrointestinal tract, it can be more effective to provide the raw materials - cysteine, glycine and glutamic acid, for the body to manufacture it. As glycine and glutamic acid are readily available cysteine can be the limiting factor. Cysteine is found in sulphurous foods such as garlic, onions and cruciferous vegetables (broccoli, kale, cabbage, cauliflower and watercress) and in meat, eggs and dairy, or can be supplemented as NAC (N-acetyl cysteine).

The glutathione transferase (GST) genes are a family (group) of genes, which use glutathione to conjugate (bind) toxins for removal from the body. The GSTM1 gene is particularly important for liver detoxification. GSTM1 gene variants can cause partial or whole gene deletion and result in complete absence of GSTM1 activity. The frequency of the GSTM1 null (absent) genotype ranges from 23% to 62% in different populations (about 50% in Caucasians).

Nutrition Advice

Individuals with low GSTM1 activity may be more sensitive to toxins and will benefit from reducing their overall toxic load and optimising glutathione levels.

Your Results

GSTM1 II

Normal activity. The GSTM1 gene is present. Good ability to detoxify heavy metals, hormones, environmental pollutants, some medications and carcinogens. High levels of oxidative stress and low glutathione levels will slow GSTM1 activity regardless of genotype.

Ensure good antioxidant intake including glutathione, and vitamins C and E.

Find out more about the GST family of genes in the Detoxification and Oestrogen Balance reports.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Appetite

Eating behaviour is a complex trait with both genetic and environmental influences.

Variations in genes involved in the regulation of food intake, FTO (fat mass and obesity-associated gene); leptin, the leptin receptor (LEPR); and ghrelin, may contribute to obesity risk by reducing satiety and increasing hunger.

Leptin is the 'satiety hormone' which inhibits hunger and stimulates metabolism after eating and during physical activity. It is opposed by ghrelin, the 'hunger hormone', which generates the desire to eat when energy levels are low. In obesity, leptin levels are higher and 'resistance' (loss of sensitivity) to leptin may occur, so one never feels full.

Variances on the LEPR gene can also reduce sensitivity to leptin, having the same effect of reducing satiety and increasing the likelihood of overeating and obesity.

The FTO gene is associated with predisposition to obesity due to its role in control of food intake and food choice. Variances on FTO confer a preference for energy-dense foods, higher fat intake and bigger meal size due to down-regulated adipocyte (fat cell) production of leptin.

Nutrition Advice

Studies involving FTO variants demonstrate that genetic predispositions to obesity can be overcome by dietary interventions, including limiting saturated fats and overall energy intake, and exercise. Omega 3 fatty acids found in oily fish (salmon, mackerel, sardines), chia seeds and walnuts have been shown to increase sensitivity to leptin. A good sleep routine can also help to improve leptin sensitivity.

Your Results

FTO AT

Reduced Satiety. Increased preference for calorie-dense (sweet and high fat) foods linked to higher BMI, waist circumference and obesity.

Regular physical activity can significantly diminish the impact of this variant. Ensure good intake of protein and fibre.

LEPR GG

Reduced satiety. Reduced sensitivity to leptin, associated with reduced satiety risk of overeating and increased body weight.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Sugar and Fat

Insulin is a hormone which helps to keep blood sugar in balance. When levels of blood sugar rise due to carbohydrate consumption or stress, insulin release triggers cells to take in glucose. Insulin also inhibits the liver from breaking down fat for energy. Unused glucose is stored as glycogen in muscle and liver cells, or as subcutaneous fat.

Genetics, diet and a sedentary lifestyle can interact to disrupt blood sugar regulation. As cells' energy storage capacity is reached they become resistant to insulin and stop taking in glucose. In addition, insulin resistant liver cells allow glucose and triglycerides to be be released into circulation. A vicious cycle of hyperglycaemia, high insulin, and elevated blood triglycerides evolves. As an emergency measure triglycerides are deposited in the abdomen (as visceral fat) and liver (causing fatty liver).

Nutrition Advice

TCF7L2 is the gene most strongly associated with type 2 diabetes susceptibility and with gestational (pregnancy) diabetes. Genetic variants increase TCF7L2 activity which can lower insulin response to ingested glucose by up to 5x. People with this genotype have a lower glycaemic threshold and are at more risk of becoming 'fat on the inside' rather than overtly obese. This risk can be reduced by limiting simple carbohydrates (sugar) consumption.

The PGC1A gene plays an important role in regulating whole body energy metabolism, including fatty acid breakdown and insulin sensitivity. Lower PGC1A activity, due to ageing and genetic variance, is associated with reduced metabolism, mitochondrial function, insulin sensitivity and beta cell function; and increased risk of obesity and type 2 diabetes. Exercise, fasting and exposure to cold are effective ways to stimulate PGC1A.

Your Results

PGC1A CC

Normal metabolism. PGC1A gene activity reduces with age which can lower metabolic rate and increase the risk of weight gain, insulin resistance and type 2 diabetes.

Regular exercise, fasting and exposure to cold can all stimulate PGC1A and increase metabolism, including break down of stored fats for fuel.

TCF7L2 CC

Normal insulin release. No change to gene expression. This genotype is not associate with increased risk of insulin resistance.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Inflammation

Inflammation is part of the body's natural defence against toxins, infections and injuries. It can be classified as either acute or chronic.

Acute inflammation starts rapidly and typical symptoms - redness, heat, swelling and pain - can appear almost immediately. It is a natural healthy process that enables the body to heal and usually resolves within a few days. In contrast, chronic inflammation is prolonged and can for last months. Chronic inflammation can be caused by extended acute inflammation, autoimmune response, or ongoing exposure to irritants. It is also linked to poor sleep, stress, excessive exercise, obesity, and consumption of pro-inflammatory foods.

TNF (tumour necrosis factor) plays a vital role in protecting against infection by controlling the inflammatory response. Genetic variants can predispose someone to inflammation and have been linked to many diseases including autoimmune conditions (rheumatoid arthritis and psoriasis), insulin resistance, and cancer.

The IFNG (interferon gamma) gene is critical to the innate and adaptive immune response to viral and bacterial infections. Genetic variants that increase IFNG activity, and inflammation, can protect against infections like tuberculosis, but increase the risk of developing autoimmune diseases, such as inflammatory bowel disease and lupus. Increased IFNG expression is also associated with disrupted energy expenditure, metabolic disfunction and increased risk of type 2 diabetes.

Nutrition Advice

Limit intake of pro-inflammatory foods - sugar, dairy, fried foods, vegetable oils (which are high in Omega-6), artificial sweeteners, processed meats, and alcohol. Natural anti-TNF nutrients include curcumin (turmeric), catechin (in green tea) and echinacea. Omega-3 fats found in fresh, 'oily' fish, such as salmon, sardines, mackerel and anchovies also have powerful anti-inflammatory effects. Moderate, regular exercise can help reduce inflammation and excess weight.

Your Results

IFN- amma TT

Higher risk. Potential for increased IFN-γ release and inflammatory response to bacterial and viral infections, which can lead to chronic inflammation and slow metabolism.

Reduce your risk of infection by supporting your immune system.

TNF GG

Normal. Normal TNF levels and response to inflammation.

Reduce inflammation with curcumin, catechin, green tea and echinacea and omega 3 fatty acids, found in oily fish.

Discover the impacts of inflammation in the APOE and Thyroid Balance report.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Blood Pressure

High blood pressure (hypertension) is a common condition whereby greater force of blood against artery walls may cause damage and increase the risk of heart disease, heart attack and stroke. Whilst most people with high blood pressure have no signs or symptoms, some may experience shortness of breath, headaches, heart palpitations or nose bleeds.

The ACE and AGT genes form part of the renin-angiotensin-aldosterone system (RAAS) which regulates blood pressure and balance of fluids and salts (electrolytes) in the body. AGT provides instructions for making angiotensinogen, which is broken down by renin to angiotensin I, and further converted to angiotensin II by ACE.

There are three mechanisms by which angiotensin II raises blood pressure: i) constriction of blood vessels; ii) production of aldosterone, which triggers absorption of salt and water by the kidneys, thereby increasing fluid levels; and iii) inhibition of bradykinin, a vasodilator and mild diuretic.

Variants on AGT and ACE genes can increase levels of angiotensin II, resulting in vasoconstriction, retention of sodium and water and higher blood pressure. Risk of hypertension is also increased with age, race (African heritage), family history, obesity, having a sedentary lifestyle, smoking, high salt/ low potassium intake, heavy drinking, stress and by having other chronic conditions such as kidney disease, diabetes or sleep apnea.

Nutrition Advice

Carriers of higher risk genotypes should monitor blood pressure regularly. Eating a diet high in salt can exacerbate the genetic risk of high blood pressure. Potassium is an essential nutrient that can counterbalance the blood pressure raising effects of sodium. Apricots, bananas and coconut water are good natural sources of potassium.

Your Results

ACE	AG	Potential for increased ACE activity and angiotensin II levels which can contribute to higher blood pressure. Have your blood pressure checked annually, particularly if there is a family history. Reduce risk by - not smoking, taking regular exercise, moderating alcohol, and salt intake, managing stress and maintaining a healthy weight.
AGT	GA	Increased angiotensinogen synthesis, and potential increase in angiotensin and blood pressure, particularly if there is a family history of hypertension.

For a deeper analysis of genes involved in cardiovascular health we recommend the Methylation and APOE reports.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Circadian Rhythm

Our biological clocks are regulated by circadian rhythms which respond primarily to light or dark. Darkness signals the body temperature to drop and the release of the sleep hormone melatonin. Exposure to light stimulates a raise in body temperature and cortisol release which promotes wakefulness.

The term chronotype describes someone's sleeping characteristic - if they are naturally a morning person ('early bird') or an evening person ('night owl'). Understanding your chronotype can enable sleep patterns to be adjusted in order to optimise recovery and indicate the time of day you are likely to focus or perform better.

An early bird's clock runs slightly fast, and their circadian rhythm is just short of twenty four hours. They naturally wake, focus and perform better in the morning, are less likely to feel tired in the day, and prefer to go to bed earlier. Conversely, a night owl's clock runs slightly slow. They may find it more difficult to wake and get up early and are more likely to peak in the late afternoon or early evening.

The master circadian clock is controlled by a group of 'clock genes' including CLOCK and PER, which are active in the SCN (suprachiasmatic nucleus) in the brain. Genetic variants on the CLOCK gene are associated with reduced sleep duration whereas PER1 variances are associated with delayed sleep onset (night owl tendency). The master clock synchronises peripheral clocks to regulate blood pressure, body temperature and sugar and fat metabolism.

Nutrition Advice

Having a regular wake time is one of the most effective ways of training your body clock. If you are tired from getting up early your going-to-sleep time should adjust naturally.

Foods that contain tryptophan, including white meats, bananas and almonds, help the body make serotonin and subsequently melatonin, the sleep hormone.

Your Results

CLOCK	AA	No impact on sleep duration or timing. Circadian rhythm may be shorter than 24 hours, with a preference to wake and sleep earlier - an early bird trait.
PER1	GA	Less active PER gene. More likely to be a night owl, preferring to sleep and rise later, and with a later daily activity peak.

To Find out more about the genes that impact sleep we recommend the Nervous System report.

Sample

 © Copyright 2021, Lifecode Gx® Ltd

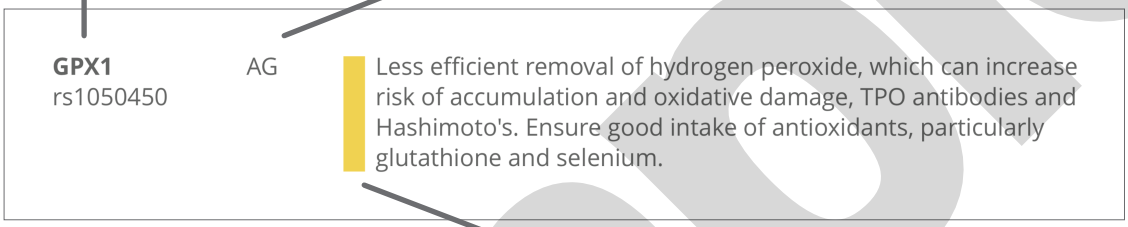
How to Read the Report

Genes

Results are listed in order of the gene short name. The 'rs' number is the reference sequence number that identifies a specific location on the genome. It is also known as a SNP (Single Nucleotide Polymorphism) pronounced 'snip', polymorphism or mutation.

Personalised Result

Your genotype result is shown as two letters (A,G,T or C) which represent the DNA bases present at that location.



Highlight Colour

The genotype result highlight indicates the potential effect of the SNP on gene function in a particular context.

RED the effect of the variant is negative

AMBER the effect of the variant is somewhat negative

GREEN no variation, or the effect of the variant is positive

Sample

 © Copyright 2021, Lifecode Gx® Ltd

References

ACE Angiotensin I Converting Enzyme

Schüler R, Osterhoff MA, Frahnow T, et al. High-Saturated-Fat Diet Increases Circulating Angiotensin-Converting Enzyme, Which Is Enhanced by the rs4343 Polymorphism Defining Persons at Risk of Nutrient-Dependent Increases of Blood Pressure. J Am Heart Assoc. 2017;6(1):e004465. Published 2017 Jan 17. doi:10.1161/JAHA.116.004465 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5523633/)

ADORA2A Adenosine A2A Receptor

GoldsteinER, ZiegenfussT, KalmanD, et al. (2010) International Society of Sports Nutrition position stand: caffeine and performance. J Int Soc Sports Nutr 7, 5 (https://jissn.biomedcentral.com/articles/10.1186/1550-2783-7-5)

AGT Angiotensinogen

Zhai C, Cong H, Zhang H, Hou K, Zhang Y, Zhang Y. M235T polymorphism in the angiotensinogen gene and cardiovascular disease: An updated meta-analysis of 39 case-control comparisons. Anatol J Cardiol. 2019;21(4):222–232. doi:10.14744/AnatolJCardiol.2019.75282 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6528503/)

BCO1 Beta-Carotene Oxygenase 1

Leung W.C., Hessel S., Meplan C., Flint J., Oberhauser V., Tourniaire F., Hesketh J.E., von Lintig J., Lietz G. Two common single nucleotide polymorphisms in the gene encoding beta-carotene 15,15 -monoxygenase alter beta-carotene metabolism in female volunteers. FASEB J. 2009;23:1041–1053. doi: 10.1096/fj.08-121962. (https://www.ncbi.nlm.nih.gov/pubmed/19103647)

Lietz G., Oxley A., Leung W., Hesketh J. Single nucleotide polymorphisms upstream from the beta-carotene 15,15 -monoxygenase gene influence provitamin A conversion efficiency in female volunteers. J. Nutr. 2012;142:161S–165S. doi: 10.3945/jn.111.140756 (https://www.ncbi.nlm.nih.gov/pubmed/22113863)

CLOCK Circadian Locomotor Output Cycles Kaput

Daniel Katzenberg, Terry Young, Laurel Finn, Ling Lin, David P. King, Joseph S. Takahashi, Emmanuel Mignot, A CLOCK Polymorphism Associated with Human Diurnal Preference, Sleep, Volume 21, Issue 6, September 1998, Pages 569–576, https://doi.org/10.1093/sleep/21.6.569 (https://www.ncbi.nlm.nih.gov/pubmed/9779516)

CYP1A2 Cytochrome P450, Family 1, Subfamily A, Polypeptide 2

Thorn CF, Aklillu E, McDonagh EM, Klein TE, Altman RB. PharmGKB summary: caffeine pathway. Pharmacogenetics and Genomics. 2012;22(5):389-395. doi:10.1097/FPC.0b013e3283505d5e. (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3381939/)

Yang A, Palmer AA, de Wit H. Genetics of caffeine consumption and responses to caffeine. Psychopharmacology (Berl). 2010 Aug;211(3) 245-257. doi:10.1007/s00213-010-1900-1. PMID: 20532872; PMCID: PMC4242593. (http://europepmc.org/abstract/MED/20532872)

FTO Fat Mass and Obesity-Associated Gene

Day F, R, Loos R, J, F, Developments in Obesity Genetics in the Era of Genome-Wide Association Studies. J Nutrigenet Nutrigenomics 2011;4:222-238 (https://www.karger.com/Article/FullText/332158)

FUT2 Fucosyltransferase 2

Kudo, T., Iwasaki, H., Nishihara, S., Shinya, N., Ando, T., Narimatsu, I., Narimatsu, H. (1996). Molecular genetic analysis of the human Lewis histo-blood group system. II. Secretor gene inactivation by a novel single missense mutation A385T in Japanese nonsecretor individuals. J. Biol. Chem. 271: 9830-9837. (http://www.ncbi.nlm.nih.gov/pubmed/8621666)

Lewis, Zac & Totten, Sarah & Smilowitz, Jennifer & Popovic, Mina & Parker, Evan & Lemay, Danielle & Van Tassell, Maxwell & Miller, Michael & Jin, Yong-Su & German, Bruce & Lebrilla, Carlito. (2015). Maternal fucosyltransferase 2 status impacts gut bifidobacterial communities of breastfed infants. Microbiome. 3. 10.1186/s40168-015-0071-z. (https://www.researchgate.net/publication/274369788_Maternal_fucosyltransferase_2_status_impacts_gut_bifidobacterial_communities_of_breastfed_infants)

Tanaka T, Scheet P, Giusti B, et al. Genome-wide Association Study of Vitamin B6, Vitamin B12, Folate, and Homocysteine Blood Concentrations. American Journal of Human Genetics. 2009;84(4):477-482. doi:10.1016/j.ajhg.2009.02.011. (https://www.ncbi.nlm.nih.gov/pubmed/19303062)

GC Group-specific component (vitamin D binding protein)

Thomas J Wang et al, Common genetic determinants of vitamin D insufficiency: a genome-wide association study, In The Lancet, Volume 376, Issue 9736, 2010, Pages 180-188, ISSN 0140-6736, https://doi.org/10.1016/S0140-6736(10)60588-0. (http://www.sciencedirect.com/science/article/pii/S0140673610605880)

Sample

 © Copyright 2021, Lifecode Gx® Ltd

Sample

Some pages have been
omitted in the sample

Lifecode GX ®
— Professional Genotype Analysis —

Sample

Disclaimer

The information provided should not be used for diagnostic or treatment purposes and is not a substitute for personal medical advice. Use the information provided by Lifecode Gx® solely at your own risk.

Lifecode Gx® makes no warranties or representations as to the accuracy of information provided herein. If you have any concerns about your health, please consult a qualified health professional.

© Copyright 2021, Lifecode Gx® Ltd