



dnaactive

Welcome

SAMPLE REPORT

to your DNA Active report

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DNA Active is designed to guide you on your journey to live a healthier and more active life, and help you reach your performance goals.



DNA Active was created by DNALysis for trainers wanting to assist their clients in optimising their fitness.

Genetics and personalised medicine

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

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



NORMAL GENE

Genotype for baseline performance potential

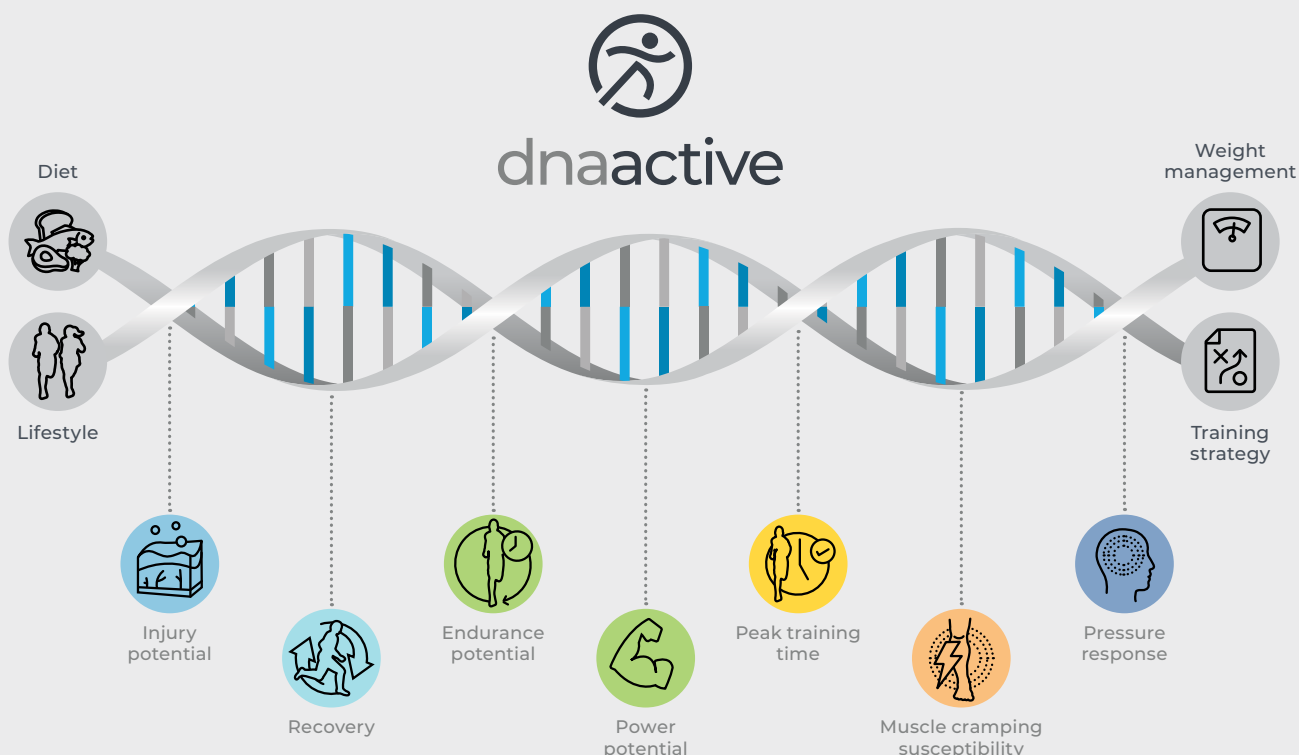


VARIANT GENE

Genotype for increased performance potential

Personalised medicine and your performance goals

Think of this report as your handy reference guide to weight management, exercise responsiveness, nutrient requirements, and a host of other factors that will combine to help you reach your performance goals. There is a lot to take in but don't worry; your genes never change and so you can refer to this report at any time.



Result summary

Outcomes: Exercise

CATEGORY	IMPACT
 Injury potential	 HIGH
 Recovery	 FAST
 Endurance potential	 MODERATE
 Power potential	 MODERATE
 Peak training time	 MORNING TRAINING
 Muscle cramping susceptibility	
 Caffeine metabolism	 SLOW
 Pressure response	 MODERATE

Outcomes: Weight management

NUTRIENT	IMPACT
 Saturated fats	 LOW-MODERATE
 Carbohydrates	 LOW-MODERATE
 Exercise for weight management	 LOW INTENSITY

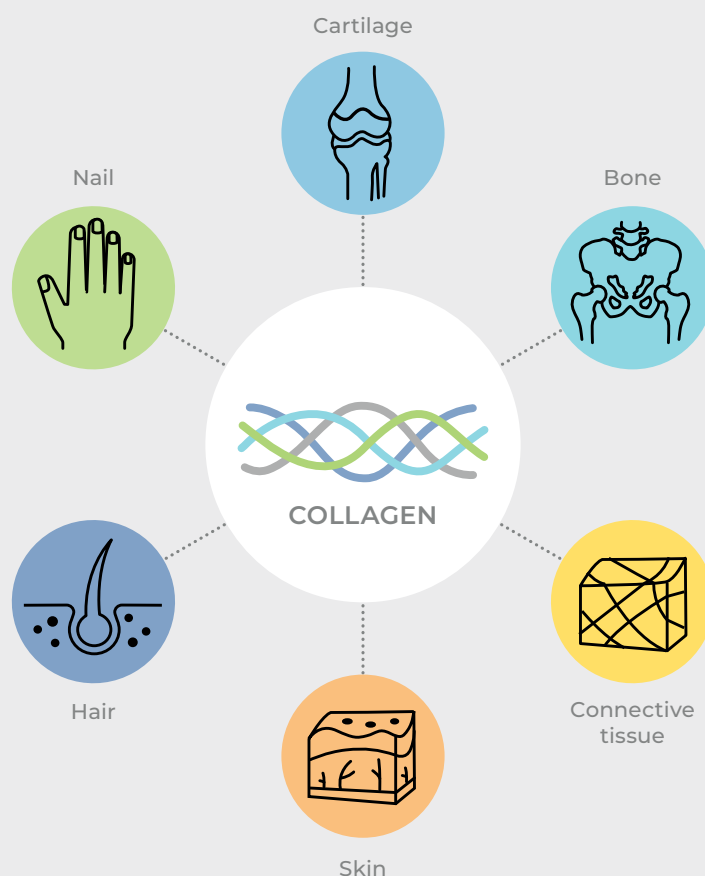
Gene results and personalised recommendations: Exercise



Injury potential

In order to optimize performance in sport, athletes must maximize the stiffness of the musculoskeletal system. This stiffness is directly related to the individuals movement economy. In other words, the greater the musculoskeletal stiffness, the better the performance. However, when the tendon is stiffer than the muscle is strong, the protective effect of the tendon is lost and the chance of an injury increases.

Genes involved in the structural integrity and remodeling of soft tissues such as tendons and ligaments can be implicated in the risk of injury. These soft tissues are made up predominantly of collagen which has many important functions in the body, including providing your skin with structure and strengthening your bones. Collagen also helps maintain the integrity of your cartilage, which is the rubber-like tissue that protects your joints.



If you focus on a particular sport, you could be prone to more sport-specific injuries, for example, runners are prone to any number of injuries including Achilles tendinopathy, calf or hamstring strains and IT band syndrome; cyclists are prone to knee, back and neck pain; swimmers are prone to swimmers' shoulder and breast-stroke knee. Consider setting up a practice of sport-specific conditioning exercises, taking specific advice from a coach or exercise professional who specializes in your event.

Recommendations



Injury potential



Gene variation	Result
COL1A1 G>T	GG
COL5A1 C>T	TT
GDF5 C>T	TC



Recommendations

Resistance training, plyometrics, Pilates, yoga, sport-specific conditioning, vit C, iron, protein, possible hydrolysed collagen supplement

Your genetic results indicate that you have an increased injury potential. This means that you will need to be careful, ensuring that your training volumes and intensities are appropriate to your fitness level and that you engage in regular conditioning exercises that will improve your soft tissue function. Tendons produce more collagen and become stronger when they are exercised intermittently. Small range-of-motion exercises, two or more times a week, targeted to a specific area with very light weight are effective at increasing collagen synthesis and connective tissue function. It is important to ensure adequate intake of vitamin C, iron and protein in your diet. Without enough dietary vitamin C, the body is not able to produce and hydroxylate collagen. Increase your vitamin C intake by adding citrus fruits, broccoli, cauliflower, kale, red, green or yellow peppers and sweet potatoes to your diet.

After intense training sessions look to take in a good quality protein source for amino acid building. Dietary collagen is found in the connective tissues of animals. Thus, foods like chicken skin, pork skin, beef, and fish are good sources of collagen. If you are exercising regularly at moderate and high intensities, you may consider supplementing your diet with hydrolysed collagen or even using a bone broth.



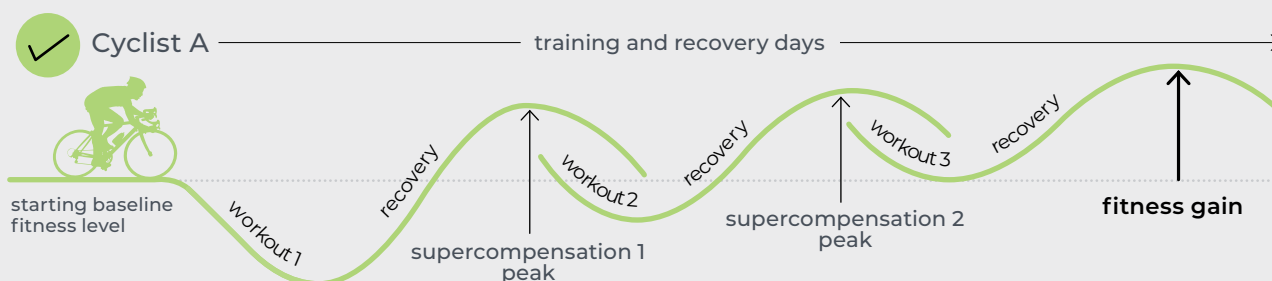


Recovery

There are limits to how much stress the body can tolerate before it breaks down and risks injury. Doing too much work, too quickly will result in injury or muscle damage, but doing too little, too slowly will not result in any improvement. Building recovery time into any training program is important to let the body adapt to the stress of exercise. Recovery also allows the body to replenish energy stores and repair damaged tissues.

When you go for a run, lift weights, or play football, any discomfort tells the body that it needs to be better equipped to deal with the situation. The response: it becomes stronger, bigger, or more efficient – this is called supercompensation and it is why we exercise.

Proper training: supercompensation



Incorrect training



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

Recommendations



Recovery

FAST



Gene variation	Result
IL6 G>C	GG
IL6R A>C	AA
CRP G>A	GG
TNFA G>A	GG
SOD2 C>T	TT
eNOS G>T	GT

From a genetic perspective, you recover at a fast rate from strenuous exercise, but in order to gain maximal returns from your training, it would still be worth taking note of some recovery strategies.

Recovery is classically considered as the time between sessions. According to training theories, we require 2-3 days between hard training sessions. Because you have a fast recovery rate, once a training base is established you may expect to hit 3-4 hard sport-specific sessions per week. Other 'steady' recovery and conditioning sessions can be built around these 3-4 big sessions. If you are a seasoned athlete, you could potentially progress to a once a day routine with an additional session on some days. Always allow one full day off per week.

Recreational athletes with other commitments might wish to max out at a total of 6 sessions per week.

Exercise progress is as much concerned with eating correctly as it is with what you do in the gym. Ensure that you are eating enough calories to recover and that you have your macronutrients balanced properly. Because inflammation and oxidative stress influence recovery rates, you should look to consume mostly anti-inflammatory and antioxidant foods in your diet and avoid those that are pro-inflammatory.





Anti-inflammatory diet

FOODS TO AVOID 	FOODS TO MODERATE 	BENEFICIAL FOODS 
• Smoked food • Processed meats & sausages • Alcohol • Nicotine • Sugar • Chocolate • Confectionery • Food preservatives • Recreational drugs	• Dairy (including cheese) • Animal fats • Red meat • Coffee & tea • Dark chocolate • Chargrilled meat • Grains (especially wheat) • Eggs • Red wine	• Green leafy vegetables • Other vegetables • Fruit, nuts & seeds • Extra virgin olive oil • Sea vegetables • Fish (including their oils) • Green tea • Herbs and spices (especially turmeric, ginger, cinnamon & nutmeg)





Exercise for performance

Power versus endurance training

Have you ever noticed that some people respond better to specific exercises than others? This is because our unique genetic profile can affect physiological processes that impact the amount of benefit we each get from power or endurance training. Power involves using strength to overcome resistance, while endurance refers to sustained effort with no reduction in performance.

Generally, power-based activities are of short length with high intensity. Power or anaerobic exercise is any activity that breaks down glucose for energy without using oxygen. The idea is that a lot of energy is released within a small period, and your oxygen demand surpasses the oxygen supply. Examples of power sports include Olympic lifting, long jump and shot put. These are all events that require a huge amount of explosive force.

In contrast, endurance type activities are for example long distance runners or cyclists. Aerobic exercise or endurance training is sometimes known as “cardio” – exercise that requires pumping of oxygenated blood by the heart to deliver oxygen to working muscle. Aerobic exercise stimulates the heart rate and breathing rate to increase in a way that can be sustained for the entire exercise session. Examples of aerobic exercises may include cardio machines, cycling, running, swimming, walking, hiking, aerobics classes, dancing, cross country skiing, and kickboxing.

When deciding on what type of exercise to focus on, consider your genetic results in the context of your current health and performance goals and tailor appropriately, keeping in mind the importance of sport-specific training.

Training ratio



Training programme

POWER

mixed

endurance



You are likely to have enhanced performance benefits from adjusting your training ratio to include mostly power, strength or speed specific exercises. This means that you should include short-duration, high-intensity exercises in your training program, such as sprint or interval cardio training. Weight training may involve low repetition counts with heavier weights. Please keep current fitness and strength levels in mind when choosing a more strength based program.

Although you have tested as predominantly power-based, remember to include some low and moderate intensity training as well as conditioning exercises in order to stimulate a range of energy systems for a well-balanced cardiovascular fitness.

As someone who has good power potential, we recommend that you focus your efforts on the moderate to high intensity sessions at about 70 – 95% of your max HR or sessions that feel moderate to hard, where you would be breathless and not able to say more than a few words at a time (Zones 3-5 in the Cardio Zone Training Table).

Gene variation

Result

AGT T>C

TT

ACE I>D

DD

BDKRB2 C>T

CT

VEGF C>G

CG

NRF2 A>G

AA

PPARGC1A G>A

GG

PPARA G>C

GG

ADRB2 Arg16Gly A>G

AG

ADRB2 Gln27Glu C>G

CG

TRHR C>T

CT

ACTN3 R>X

RR

VDR T>C

TT



Recommendations

Sprints, interval training,
free weights, weightlifting,
plyometric exercises





Cardio zone training table

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

Calculating your target heart rate:



✓ Maximum heart rate = $220 - \text{age}$



✓ Heart rate reserve = maximum heart rate – resting heart rate



✓ Target heart rate = $(\text{heart rate reserve} \times \text{training \%}/100) + \text{resting heart rate}$

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

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





Peak training time

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

Gene variation	Result
CLOCK3111 T>C	TT

Your result indicates that you may have a tendency for improved performance with morning training.

Your result indicates that you may have a tendency toward:

MORNING TRAINING



It is, however, also important to take into account the time of day of your competition or event when deciding on your training times as you would ideally like to become accustomed to activity during that time.



Muscle cramping susceptibility

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

Recommendations



Risk of muscle cramping

Gene variation	Result
AMPD1 G>A	



Caffeine metabolism

Moderate doses of caffeine have been known to improve both sprint and endurance performance. However, a moderate to high intake of caffeinated beverages, such as more than two cups of coffee per day, is associated with an increased risk of heart disease if you are a slow caffeine metabolizer.

Recommendations



Caffeine response



CYP1A2 is the main enzyme that metabolizes caffeine. A CC result indicates that you have a reduced ability to metabolize caffeine.

It is recommended that you rather opt for decaffeinated options.

In terms of performance benefits, you may need to consume your caffeine more than an hour before the start of a race or event in order to gain from the effects.

Gene variation	Result
CYP1A2 C>A	CC



Pressure response

Your ability to respond to increased pressure and adapt to stressful situations, whether in competitive sport or your personal or professional life, may affect the quality of your performance.

A poor response to pressure or stress can lead to a drop in both physical and mental capability. However, awareness of your pressure response can assist you in improving stress management and train yourself to endure high pressure situations without a decline in performance.

Recommendations



Pressure response

MODERATE



According to your genetic results, you should be able to manage stress relatively well as long as your lifestyle supports resilience building.

Exercise regularly and maintain a consistent fitness level as this will significantly improve cognitive function.

Ensure adequate intake of good quality protein (source of Tyrosine) and B vitamin rich foods such as green leafy vegetables, beans, and lentils.

Gene variation	Result
COMT 472 G>A	AG

Gene results and personalised recommendations: Weight Management



Saturated fats

Saturated fats are a type of dietary fat which is typically semi-solid at room temperature. Foods high in saturated fat include. include baked goods, fried foods, animal fats including fatty or processed meats, whole-fat dairy products and fats like coconut oil, palm or palm kernel oils found in packaged foods.

Recommendations



Impact

LOW-MODERATE



According to your gene results, moderating saturated fat intake is a low-to-moderate priority for you, meaning that a very high intake of saturated fat may possibly lead to slower weight loss outcomes.

Gene variation	Result
FABP2 Ala54Thr G>A	GA
ADIPOQ -11391 G>A	
PPARG Pro12Ala C>G	CC
APOA2 265 T>C	CT
TCF7L2 C>T	TT
FTO T>A	TT
APOA5 1131 T>C	TC
PLIN 11482 G>A	GG
MC4R V103I T>C	TT
TNFA -308 G>A	GG



Carbohydrates

A high carbohydrate intake has often been associated with an increased risk for obesity and insulin resistance, meaning that a high intake of carbohydrate may hinder your ability to lose weight.

Recommendations



Impact

LOW-MODERATE



According to your gene results, you scored in the low-to-moderate priority range for carbohydrate responsiveness, meaning that a high intake of carbohydrate in the diet may slightly affect your ability to lose weight. Moderate your total carbohydrate intake.

Gene variation	Result
ADIPOQ -11391 G>A	
ADBR2 Gln27Glu C>G	CG
DRD2 C>T	CC
TAS1R2 Ile191Val G>A	AA
SLC2A2 Thr110Ile C>T	TC

Remember that there is a difference between “good” carbohydrates and “bad” carbohydrates. Try focusing on good carbohydrates: all vegetables, whole fruit, legumes and whole grain products like oats, brown rice or quinoa. Try to avoid refined carbohydrates: sugar sweetened beverages, fruit juices, pastries, white bread, white pasta or white rice. Refined carbohydrate foods are usually lacking in fibre and other essential nutrients. They are “empty” calories.



Exercise for weight management

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

Recommendations



Optimal intensity

LOW INTENSITY



A LOW-INTENSITY exercise programme of 4 x 60-minute sessions a week is suggested for you as a minimum in order to manage your weight. These can be broken down into 8 x 30-minute sessions or other possible variations.

One of the most important elements is the intensity of your workout. But how do you know if you're working at the correct intensity level? There's no precise definition, but there are ways to monitor how hard you're working: for example, if you are working at a low-intensity level, you should feel as though you can maintain that pace for a few hours and you should be able to easily hold a conversation with someone else. The energy expenditure will be different for every single person as it depends on a multitude of factors such as age, gender, body composition and current level of fitness. Something that might seem very easy for you, may be much more difficult for someone else.

Gene variation	Result
ADBR2 Arg16Gly C>G	AG
ADBR2 Gln27Glu C>G	CG
ADRB3 Trp64Arg T>C	TT
FTO T>A	TT
PPARG Pro12Ala C>G	CC



Recommendations

Walking, Yoga,
Cycling for leisure, Water aerobics,
Rowing (50 watts)



Mono-unsaturated fats

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

Recommendations



Benefit

MODERATE



According to your genetic results, this is a moderate benefit for you, and increasing intake of mono-unsaturated fat to 13% of total energy intake is recommended for optimal weight management.

Foods to consider adding to your diet include olive oil, nuts (macadamias, almonds, cashews, peanuts, pistachios), olives, pumpkin or sunflower seeds and avocados.

Gene variation	Result
FABP2 Ala54Thr G>A	GA
ADIPOQ -11391 G>A	
TCF7L2 rs7903146	TT



Poly-unsaturated fats

Genetic variants in certain genes have been associated with a lower body weight in individuals when there is a higher intake of poly-unsaturated fats in the diet, with a focus on omega 3 fatty acids. Poly-unsaturated fats are essential for brain function and managing inflammation. The best source of omega-3 fatty acids is fatty fish like salmon, sardines or pilchards. Other sources include pine nuts, walnuts and flax- and sunflower seeds.

Recommendations



Benefit

LOW



According to your genetic results, this is a low priority for you, and standard guidelines for poly-unsaturated fat intake should be recommended.

Gene variation	Result
PPARG Pro12Ala C>G	CC
FTO T>A	TT
TNFA -308 G>A	GG



Protein

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

Recommendations



Benefit

LOW

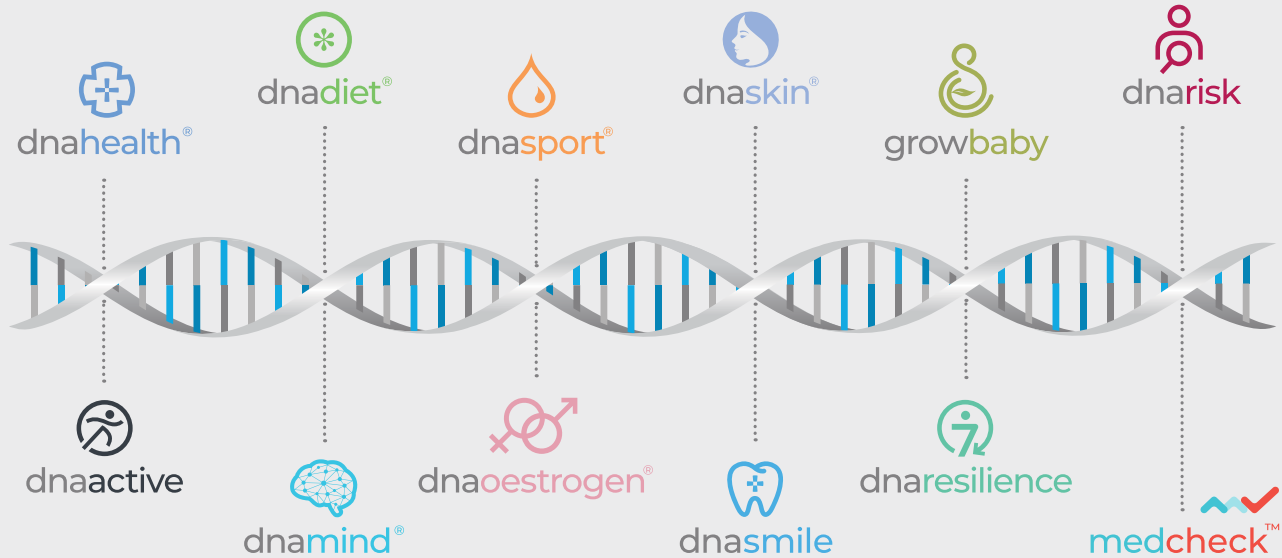


According to your genetic results, this is a low priority for you, and standard guidelines for protein intake should be recommended.

Gene variation	Result
FTO T>A	TT

A lifetime of optimal health awaits you

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



*Requires finger prick blood spot sample collection

Our Commitment

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

ADVANCED | ACTIONABLE | APPROPRIATE
technology | interventions | use in practice

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