dnasport

optimal sport for life

Welcome

Example2 Example1

to your dna sport report

Date of Birth: **01 Jan 2001**	Date Reported: **17 May 2024**	Sample Number: **12345678-New**
Referring Practitioner: **Private**		

WELCOME TO YOUR DNA SPORT REPORT

The explosion in sports genomics research has revealed multiple connections between genetic variants and trainability. To fulfil your athletic potential it is important to make appropriate choices that best match your unique genetic makeup. This pioneering genetic service provides you with the specific knowledge to make exercise, nutritional and lifestyle choices that best suit your individual needs.

To achieve success in a chosen sport requires a multitude of factors, of which genetics is one part. The advice provided in this report should be used as a guide to help you optimise and personalise your training regime within your chosen sport.

The DNA Sport test looks at various different biological areas that relate to sporting performance. Insight into these areas can be used to personalise your exercise program in order to gain as much as possible from your training sessions.



dnasport
optimal sport for life

UNDERSTANDING GENETICS

Before reading your full assessment, please take a few minutes to review this background information. This will help you better understand your results and enhance the value of this personalised report.

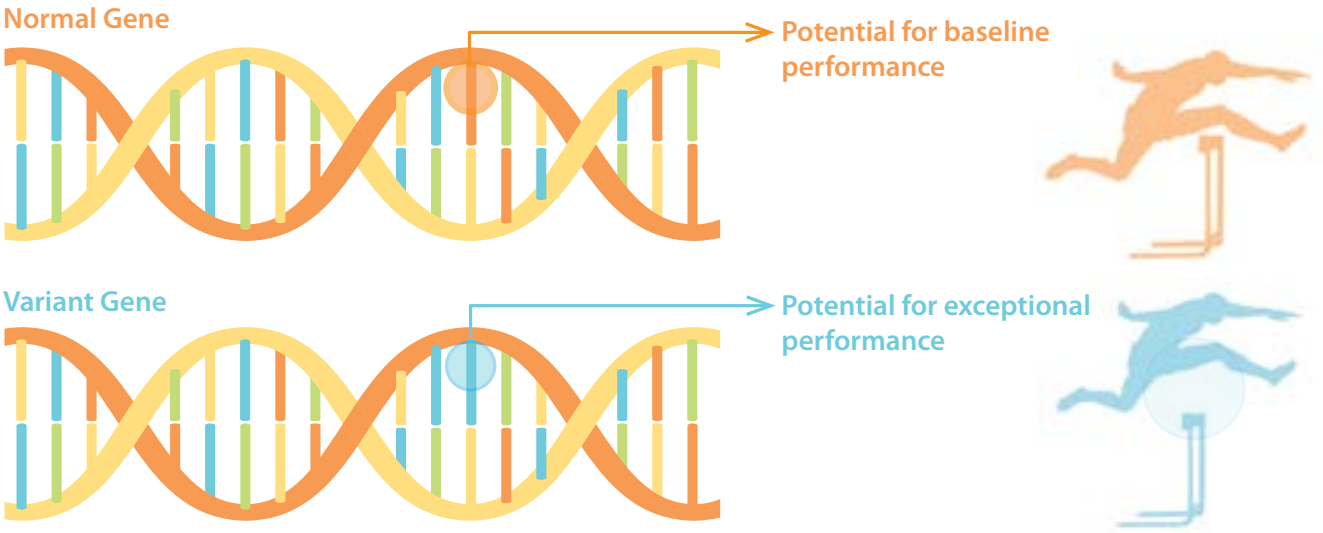
WHAT ARE GENES?

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" which make up your genetic code. The code gives the instructions to make the proteins required for proper development and function.

WHAT ARE GENE VARIATIONS?

With the exception of identical twins, all people have small differences (variations) in their genetic code. It is these differences that make each of us unique. In the same way as a single letter change can profoundly change the meaning of a word, so single base changes can profoundly affect the function of our genes.

Example:



Genetic variations can affect the biological pathway in which the gene is active, affecting metabolic functions that are important for maintaining a state of health. Knowledge of these variations offers a powerful advantage, enabling precise exercise and nutritional recommendations aimed at optimising athletic performance.



dnasport
optimal sport for life

HOW TO READ THIS REPORT

Certain genetic variants are advantageous for athletic performance, while some variants may contribute to an increased risk for injury or delayed recovery time. Details of gene names and variations that we tested are outlined in this report. Gene explanations are detailed at the back of the report. Training and nutritional recommendations that may benefit you will be given.

GENE IMPACT KEY:

Impact factors are assigned to each genetic variation based on current peer-reviewed research and the contribution of the variant to an altered response to exercise. The impact factors do not represent a good or bad variant but rather give an indication of how your genes should influence your lifestyle choices.

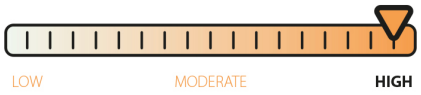
NO AFFECT ON THE BIOLOGICAL AREA IN QUESTION	**NO IMPACT:** ○
LITTLE AFFECT ON THE BIOLOGICAL AREA IN QUESTION	**LOW IMPACT:** ●
ATTENTION SHOULD BE PAID AND SOME LIFESTYLE CHANGES CAN BE MADE	**MODERATE IMPACT:** ●●
THERE IS A SIGNIFICANT IMPACT ON THE BIOLOGICAL AREA INDICATING THAT INTENSIVE DIET AND/OR TRAINING ACTION CAN BE TAKEN	**HIGH IMPACT:** ●●●



dnasport
optimal sport for life

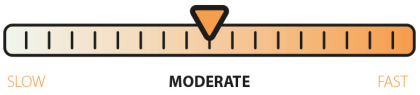
RESULTS SUMMARY

Injury Risk



Based on your gene results, you have an above average risk of sustaining a soft tissue injury.

Recovery



You are likely to recover at a moderate rate from strenuous exercise.

Power Potential



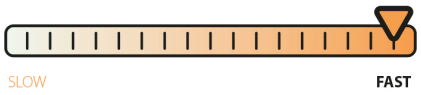
Based on the genes analysed, you have an above average potential for power/strength performance.

Endurance Potential



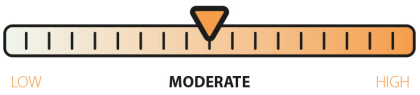
According to your gene results, you have an above average potential for endurance performance.

Caffeine Metabolism



You are able to metabolize caffeine at a fast rate.

Salt Sensitivity



You are moderately salt sensitive.

Peak Training Time:

Morning Vs Evening (circadian rhythms)



There is no genetic preference toward morning or evening training.



dnasport
optimal sport for life

YOUR GENETIC RESULTS PART 1

INJURY AND RECOVERY

We only need to look around at other individuals to realise that some of us seem to be 'injury prone', while others are never forced to skip a day of training. Additionally, some individuals are able to recover quickly from exercise and are ready to train hard again after just a days rest whereas others don't seem to 'bounce back' from hard sessions quite so quickly and need a longer break between intense training sessions. Research has revealed that certain genetic variations infer a delayed recovery from hard exercise training, while other variants put individuals at a significantly increased risk of certain injuries.

YOUR INJURY RISK

	GENE VARIATION	YOUR GENETIC RESULT	GENE IMPACT
INJURY SUSCEPTIBILITY	COL1A1 G>T	GG	●●●
	COL5A1 C>T	CT	●●
	GDF5 C>T	TT	●●●



Your genetic results indicate that you likely have a higher than average risk of developing a soft tissue injury. 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 injury-preventing conditioning exercises. Remember that nutrition also plays an important role in injury prevention.



dnasport
optimal sport for life

RECOMMENDATIONS

Your genetic results reveal that you need to be taking preventative steps to try to anticipate the strains that may occur with exercise training.

Injury prevention exercises or conditioning work can be termed 'prehabilitative training'. Resistance and flexibility training are the cornerstones for prehabilitation, and rehabilitation if an injury does occur. Examples of injury prevention exercises you should try to include are classical resistance and weight training, plyometrics, Pilates, yoga, stretching or specific conditioning exercises that have been designed to target particular injury risks (you can talk to a Biokineticist about this).

If you are training regularly it would be worthwhile doing two or more conditioning sessions per week aimed to reduce your injury risk.
If you are an elite athlete or focused on a specific sport, consider setting up an almost daily practice of sport-specific conditioning exercises. It is important to consider the most common soft tissue injuries that occur in your particular sport and take specific advice from a coach or exercise professional who specializes in your event. For example: runners are prone to Achilles tendonitis, calf strains, hamstring strains, patellar tendonitis and IT band syndrome; cyclists are prone to knee, back and neck pain; swimmers are prone to swimmers shoulder and breast-stroke knee.

With regards to nutrition, it is important to ensure adequate intake of vitamin C, iron and protein in your diet as these are necessary for collagen turnover. After intense training sessions look to take in a good quality protein source for amino acid building.
If you are exercising regularly at moderate and high intensities you may consider supplementing your diet with hydrolyzed collagen or even using a bone broth.



dnasport
optimal sport for life

YOUR RECOVERY

	GENE VARIATION	YOUR GENETIC RESULT	GENE IMPACT
INFLAMMATION	IL6 G>C	GG	○
	IL6R A>C	CC	●●●
	CRP G>A	GG	●●●
	TNFA G>A	AG	●●
OXIDATIVE STRESS	SOD2 C>T	CC	○
	eNOS G>T	GT	●●



Based on your genetic results, you are likely to recover at a moderate rate from hard exercise. This means that you should have the capacity to undertake a moderate training load with regular inputs of exercise, but it is important that you provide sufficient recovery time in order to be ready for your next training session.



dnasport
optimal sport for life

RECOMMENDATIONS

You should follow some planned recovery strategies to gain the best returns from your training and optimise performance.

Training ability comes from a mixture of genetics and slowly building a training foundation over the course of many years. If you progress your training load at an appropriate rate you can reach high levels of physical performance. If you are new to exercise, follow a slow, progressive increase in training load over the course of 1-2 years, also taking into account your injury risk.

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 moderate recovery rate, once a training base is established you may expect to hit 2-3 hard sport-specific sessions per week. Other 'steady' recovery and conditioning sessions can be built around these big 2-3. If you are a seasoned athlete you could potentially progress to a once a day routine with an additional session on 1 or 2 days of the week. Always allow one full day off per week. Recreational athletes with other commitments might wish to max out at a total of 5 sessions per week.

Sleep is vitally important for recovery and you should look to obtain enough sleep so that you feel refreshed upon rising in the morning. This might be +/- 8 hours at night and a nap in the day is especially useful for optimising recovery.

Managing your nutrition is important for optimal recovery. Because inflammation and oxidative stress influence recovery rates, you should look to consume mostly anti-inflammatory and anti-oxidant foods in your diet and avoid those that are pro-inflammatory. Focus on fruits and vegetables of many different colours; green leafy vegetables and cruciferous vegetables have particularly good anti-oxidant properties. Also look to include fish in your diet.

Consuming carbohydrate based beverages during prolonged exhaustive exercise can help to reduce levels of inflammatory cytokines such as IL6 and CRP following exercise. Consumption of a mixed protein and low GI carbohydrate meal after exercise is also known to decrease inflammation and assist recovery.

Long term, regular, light and moderate intensity exercise leads to an increase in function of anti-oxidant enzymes, as well as decrease in baseline inflammatory cytokines: beneficial to exercise training, performance and optimal health.

Avoid smoking of any kind.



dnasport
optimal sport for life

YOUR GENETIC RESULTS PART 2

PERFORMANCE

It is well established that a high percentage of the variance observed in athletic status can be explained by genetic factors. These genetic factors, as examined in your DNA Sport test, can determine how well you will respond to certain types of exercise training. Although both aerobic training, and strength and weight training are important for overall health and fitness, the ratio of these types of training should vary between individuals, even between those working towards the same goals. The overall results of this genetic test will enable you to focus your training towards the type of exercise that is going to give you the best outcomes for your hard work, whether that be endurance or power based training.

AREA OF ACTIVITY	GENE VARIATION	YOUR GENETIC RESULT	GENE IMPACT POWER	GENE IMPACT ENDURANCE
BLOOD FLOW AND RESPIRATION	AGT T>C	TT	○	
	ACE I>D	ID	●●	●●
	BDKRB2 C>T	TT		●●●
	VEGF C>G	CG		○
ENERGY DURING EXERCISE	NRF2 A>G	GG		●●●
	PPARGC1A G>A	GG		●●●
	PPARA G>C	CC	●●●	
FUEL DURING EXERCISE	ADRB2 Arg16Gly A>G	AG		●●
	ADRB2 Gln27Glu C>G	CC		●●●
	TRHR C>T	CC	○	
MUSCULOSKELETAL PROPERTIES	ACTN3 R>X	XR	●●	
	VDR T>C	TT	○	



dnasport
optimal sport for life

YOUR ATHLETIC POTENTIAL

What advantage are your genes giving you? Do you have a greater response to power training or endurance activities?



Based on our analysis and interpretation of your genetic results, you should focus on aerobic, endurance training and strength, speed and power training in order to gain the best results. This means that you are likely benefit from including long-duration, moderate intensity exercises as well as short-duration, high intensity exercises in your training program.
Remember that there are many variables that influence our success with regards to training and performance; genetics is one of these variables that should be used to understand the total outcome.



dnasport
optimal sport for life

KEY TRAINING PRINCIPLES

You are likely to have enhanced performance benefits from including both moderate intensity, long duration endurance-style exercise as well as high intensity, short duration strength, speed and power training.

The types of aerobic training to include are running, cycling, swimming, or similar types of moderate cardio exercise of long duration at a steady pace as well as short duration interval and sprint training, enhancing your power potential. Sessions can vary from 30-60 minutes at a steady pace to 5 x 4 minute repeats at a very hard pace to 10 x 20 second efforts flat out. Remember to include a warm up, as well as cooling down sufficiently afterwards.

Your strength focused weight training may include conventional free weights, machines or even weightlifting movements. Power-based plyometric exercises are also important for individuals wanting to develop explosive strength and speed. With weight training, it is important to develop basic muscular strength first before building up to heavy weights in order to avoid injury.

Low intensity weight training can be used to improve muscle contraction efficiency. This involves doing multiple repeats with relatively light weights (30 – 40% of maximum). You do have the potential to progress to high intensity weight training; low number of repeats with relatively heavy weights (60 – 70% of maximum).

Consider your genetic results in the context of your current goals and tailor appropriately, keeping in mind the importance of sport-specific training.

As someone who has mixed endurance and power potential, we recommend a range of activities that include endurance efforts at Levels 1 to 4 of the Cardio Zones Training Table as well as speed and interval training at Levels 5 to 7. Your core sessions should be moderate duration interval sessions at levels 4 and 5.



dnasport
optimal sport for life

CARDIO ZONES TRAINING TABLE

The levels referred to in the cardio training table below represent zone training that can be done either with a Heart Rate (HR) Monitor or simply by your Rate of Perceived Exertion (RPE). You will need to test yourself for your Threshold Heart Rate if you wish determine your training levels with a heart rate monitor (see below). RPE is simply a 0-10 scale of how you perceive a training session to be - 0 being nothing and 10 being maximal output. Levels 1 to 4 are considered endurance style training, whereas above level 4 is used in short duration speed and interval training exercises.

LEVEL	INTENSITY	% OF THRESHOLD HR	RPE
1	RECOVERY	<81%	<2
2	AEROBIC	81-89%	2-3
3	TEMPO	90-93%	3-4
4	SUB-THRESHOLD	94-99%	4-5
5	SUPRA-THRESHOLD	100-102%	6-7
6	AEROBIC CAPACITY	103-106%	>7
7	ANAEROBIC CAPACITY	>106%	MAXIMAL

MEASURING YOUR THRESHOLD HEART RATE AND SETTING YOUR TRAINING ZONES

Perform a solid warm-up, and then do a 30 minute time trial (all out) on a relatively flat course. Record your average heart rate for the final 20 minutes of the time trial. This is your lactate threshold heart rate (LTHR). To set your zones, your LTHR is the figure that should go between Level 4 and 5 (100%) in the cardio table above. To work out the other zone heart rates, simply multiply the LTHR by the percentages given.



dnasport
optimal sport for life

CAFFEINE METABOLISM

	GENE VARIATION	YOUR GENETIC RESULT
CAFFEINE METABOLISM	CYP1A2 C>A	AA

Moderate doses of caffeine have been known to improve both sprint and endurance performance. CYP1A2 is one of the main enzymes that metabolize caffeine.
An AA result indicates that you are able to metabolize caffeine at a fast rate. You may want to take caffeine in 30 minutes to an hour before a race or event in order to benefit from the effects. Depending on how long your race is you could take in caffeine during the race as well.

SALT SENSITIVITY

	GENE VARIATION	YOUR GENETIC RESULT
SALT SENSITIVITY	AGT T>C	TT
	ACE I>D	ID

AGT and ACE are involved in the blood pressure response to sodium intake.
A high salt intake is associated with spikes in blood pressure. Your results indicate that reducing salt intake may be beneficial to your health if you suffer from essential hypertension.

PEAK TRAINING TIME*

	GENE VARIATION	YOUR GENETIC RESULT
CIRCADIAN RHYTHM	CLOCK 3111 T>C	TC

CLOCK is an essential element of the human biological clock and is involved in metabolic regulation.
Your result indicates that you are unlikely to have an activity time preference. 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. If exercising in the morning, remember to make use of a warm up in order to increase body temperature which assists in improving performance.

* The evidence for this is not quite as high as the others, but hey it's kind of cool to know!



dnasport
optimal sport for life

GENE EXPLANATIONS

Below follows an explanation of all the genes analysed in this test. Pay particular attention to those genes where you received moderate or high impact factors in the gene tables.

INJURY

COL1A1 G>T

COL1A1 is one of the major collagens in connective tissues. Altered expression of this gene can lead to injury risk due to a structural change in the properties of the tissue. If you have the G allele, you may be at an increased risk for tendon and ligament injuries due to decreased expression of the COL1A1 gene.

COL5A1 C>T

COL5A1 is a minor collagen that regulates the formation of new soft tissue fibres. Altered expression of this gene can lead to injury risk. Having the T allele is associated with an increased risk of injury. These individuals should be aware of injury prevention strategies.

GDF5 C>T

GDF5 plays a role in the development and healing of skeletal, joint, and soft tissues. This gene influences the ability to recover from tissue damage. If you have the T allele, you have reduced expression of this gene and likely an increased risk of soft tissue injuries..

RECOVERY

IL6 G>C

IL6 is an inflammatory cytokine that stimulates an immune response to strenuous exercise. Excess release of this cytokine can lead to a chronic inflammatory state. Individuals with the C allele have increased levels of IL6 as well as the inflammatory marker CRP and are likely to require more recovery.

IL6R A>C

IL6R is a cytokine receptor that affects the action of IL6. This gene influences the fatigue experienced with regards to exercise and the ability to recover. The C allele leads to higher levels of IL6R as well as IL6, and increases the acute inflammatory effects of exercise.

CRP G>A

CRP increases in response to inflammation and plays a role in activating parts of the innate immune system. If you have the G allele: it is linked to higher levels of CRP which is associated with higher levels of inflammation. You may require longer recovery times between training sessions.



dnasport
optimal sport for life

TNFA G>A

TNFA, like IL6, is a pro-inflammatory cytokine that stimulates the acute phase reaction of inflammation. Levels of TNFA increase after intensive exercise. The A allele is linked to higher levels of TNFA as well as CRP. Individuals with the A allele are likely to experience fatigue and somewhat delayed recovery times with exercise training.

SOD2 C>T

SOD2 is an anti-oxidant enzyme within the mitochondria of the cell. Intensive training results in oxidative stress and enzymes such as these are very important in minimising muscular fatigue. If you have the TT genotype allele you are likely to have decreased efficiency in reducing oxidative stress caused by intensive exercise and thus slower recovery. Rest, incorporating low intensity exercise, and increasing fruit, vegetable and other antioxidant intake should be a priority for you.

eNOS G>T

eNOS plays a key role in the regulation of blood vessel constriction and resistance. Decreased activity of this enzyme, as is seen in individuals with the T allele, is associated with an increase in free radicals and oxidative stress.

PERFORMANCE

AGT T>C

AGT is important in the regulation of electrolyte, body fluid balance and blood pressure. The CC genotype of AGT potentially leads to vasoconstriction and increased blood pressure, and has been associated with greater power development.

ACE I>D

ACE is a key enzyme in blood pressure regulation and impacts aerobic capacity, muscular strength and lean body mass. The I allele is associated with lower ACE activity and greater muscle efficiency and aerobic capacity. The D allele is associated with higher ACE levels and greater muscle growth and strength with weight bearing, power training.

BDKRB2 C>T

BDRKB2 is involved in blood pressure regulation through bradykinin vasodilation. The T allele is associated with increased expression of this gene and greater vasodilation which is linked to greater muscle contraction efficiency, advantageous for aerobic exercise and endurance performance.



dnasport
optimal sport for life

VEGF C>G

VEGF is involved in the formation and growth of new blood vessels and therefore influences blood flow and oxygenation. The CC genotype contributes to higher VEGF levels which can lead to greater muscle efficiency with training, an advantage for aerobic capacity and endurance performance.

NRF2 A>G

NRF2 improves respiratory capacity and the rate of energy production during exercise. It is also important in the formation of mitochondria: the 'power house' of the cell where energy is produced.

The very rare G allele of NRF2 is associated with elite endurance performance and 50-60% greater improvements in VO2max with endurance training.

PPARGC1A G>A

PPARGC1A plays an essential role in energy regulation and is involved in the exercise-induced increase in mitochondria. The GG genotype is linked to greater mitochondrial biogenesis at baseline and in response to aerobic training, this is an advantage with regards to aerobic capacity.

PPARA G>C

PPARA is involved in using fatty acids to make ATP - the main source of energy during exercise. The G allele is associated with greater aerobic capacity and significantly higher slow twitch muscle fibre specialisation. The C allele is associated with a strength advantage due to the ability to build more muscle mass and have greater single muscle contraction power.

ADRB2

Adrenaline acts via ADRB2 to maintain blood glucose levels during prolonged exercise by promoting glycogenolysis. The A allele of ABRB2 Arg16Gly and the C allele of ADRB2 Gln27Glu are associated with to the ability to achieve higher aerobic capacity with endurance training. If you have these variations, focus on aerobic training that stimulates VO2max and aerobic capacity.

TRHR T>C

TRHR is involved in increasing metabolic rate which is required to mobilise fuels during exercise. If you have the rare TT genotype you are likely to have increased gains in lean body mass with training; this genetic variation is favourable for strength and power activities.

ACTN3 R>X

ACTN3 is a component of Type II (fast twitch) muscle fibres and greatly influences power development. The RR genotype is linked to a greater percentage of fast twitch muscle fibres, an advantage for strength, speed and power with training. Individuals with the XX genotype have an advantage with regards to aerobic training which is believed to be due to a greater percentage of slow twitch muscle fibres.



dnasport
optimal sport for life

VDR T>C

The VDR gene has been linked to muscle strength. Individuals with the CC genotype have an associated gain in strength with weight training. However, these individuals also tend to struggle with lower bone mineral density and should ensure adequate intake of calcium and vitamin D, as well as minimise caffeine intake.

AGT T>C

AGT is important in the regulation of electrolyte, body fluid balance and blood pressure. The CC genotype of AGT potentially leads to vasoconstriction and increased blood pressure, and has been associated with greater power development. Incidence of hypertension in individuals with the CC genotype was however found to be significantly Lower when sodium intake was reduced.

ACE I>D

ACE is a key enzyme in blood pressure regulation and impacts aerobic capacity, muscular strength and lean body mass. The I allele is associated with lower ACE activity and greater muscle efficiency and aerobic capacity. The D allele is associated with higher ACE levels and greater muscle growth and strength with weight bearing, power training. Studies show that patients with essential hypertension and an II genotype had a significantly higher blood pressure increase with high salt intake compared to DD individuals.

CYP1A2 C>A

CYP1A2 is one of the main enzymes that metabolize caffeine, a central nervous system and metabolic stimulant that is used to reduce physical fatigue. In athletics, moderate doses of caffeine have been known to improve both sprint and endurance performance. Individuals with the C allele have a reduced ability to metabolise caffeine and a moderate to\ high intake of caffeinated beverages is associated with increased risk of heart disease. C allele carriers likely need to take in caffeine more than an hour before the start of a race or event in order to gain from the effects. Individuals with the AA genotype are able to metabolise caffeine at a fast rate and may want to take caffeine in 30 minutes to an hour before a race or event in order to benefit from the effects.

CLOCK T>C

Circadian Locomotor Output Cycles Kaput (CLOCK), an essential element of the human biological clock, is involved in metabolic regulation. Carriers of the C allele have reduced sleep, report morning fatigue and show an evening preference for activities.

Notes for practitioners

From the laboratories of:

DNALYSIS Biotechnology

Distributed by:

dnalife® Nordic Laboratories®

info@dnalife.healthcare
www.dnalife.healthcare

Danny Meyersfeld (PhD) - Laboratory Director

Denmark Office: Nygade 6, 3.sal • 1164 Copenhagen K • Denmark
South Africa Office: North Block • Thrupps Centre • 204 Oxford Rd • Illove 2196 • South Africa
UK Office: 11 Old Factory Buildings • Battenhurst Road • Stonegate • E. Sussex • TN5 7DU • UK

Tlf: +45 33 75 10 00
Tel: +27 (0) 11 268 0268
Tel: +44 (0) 1580 201 687

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