SYNLAB

NAME SURNAME
MARCH 2022

Can you imagine a more complete vision of yourself?

MADEOFGENES

ADVANCED SPORT TEST

ADVANCED SPORT TEST

SYNLAB

In collaboration with MADEOFGENES

TABLE OF **CONTENTS**

DISCOVER
PERSONALISED HEALTH

Health is a state of absolute physical and emotional wellbeing. However, maintaining good health is often a challenge. Also, did you know that your own biology and lifestyle mean you need specific care? Self-care that is optimal for your body, and your body only.

Just as personalised medicine treats diseases in a precise way by using cutting-edge techniques, personalised health focuses on maintaining an optimal state of health through prevention and wellbeing, to help prevent diseases from developing and to slow down the ageing process as much as possible.

SELF-CARE HAS EVOLVED

Your body is a precious collection of cells, tissues and molecules that work together to give you life. These elements interact with each other, but also with external factors that are connected to your lifestyle and life stage, like your physical activity, stress levels or eating habits. Our health and quality of life are conditioned by this complex network of interactions. For this reason, we need to approach healthcare from a comprehensive standpoint.

MOLECULAR HEALTH: 21ST CENTURY HEALTH

By integrating the information contained in your DNA and other molecules present in your blood (such as proteins or hormones) with a habits assessment, we are able to understand the full scope of your health, including how you take care of yourself. This personalised, precise and unique concept provides our experts with the necessary tools to guide you and prioritise those actions that can improve your wellbeing the most at each stage of your life.

GET TO KNOW THE **MOLECULAR STUDY**

Our innovative molecular study integrates a blood analysis and a DNA test to get a comprehensive view of your state of health and the way you take care of yourself.

DNA test

How are you?

We study relevant genetic markers that can indicate an innate predisposition in each study area.

Blood test

How are you doing?

We measure the impact of your habits and environment through relevant biochemical markers for each area.

Professional counselling

How do you look after your health?

Prioritise and plan the actions that will help you improve your habits in the best possible way with your trusted health professional.

PRIORITISE **YOUR ACTIONS**

Each study area is assigned a status, based on their relevance to your current health.

At the beginning of your personalised report you will find a summary table with an overview of all your health areas, and your current status in each one of them

TAKE ACTION

Areas that currently require special attention. This can happen when a genetic predisposition has been detected, in which we will give you specific recommendations, and/or when your blood test results show abnormal values. We will then offer personalised recommendations and to check your levels periodically.

MONITOR

Areas in which you may have a genetic predisposition, yet your test results are within the reference range, due to your lifestyle habits or other environmental factors. In these cases we will provide recommendations that can help you keep these levels in check as much as possible, or we will suggest specific complementary tests.

KEEP IT UP

Study areas where no genetic predisposition has been found and your blood test results are within normal range. We will offer you recommendations for healthy habits to keep these areas at an optimal level. It is important not to neglect these areas and to strengthen your current health habits.

CONTENTS IN EACH **STUDY AREA**

Each area of health includes two pages with relevant insights and information about why that area is important, what your specific needs are and what you can do to improve it.

GENERAL INFORMATION

Learn why this area is important to your health and well being.

YOUR PERSONALISED RECOMMENDATION

We use our analysis algorithms to integrate all your individual variables, so we can identify the causes of your current state of health and offer you personalised recommendations.

YOUR GENETICS

We explain which of your characteristics are defined by the genes we study and their variant or genotype.

YOUR BLOOD TEST

Here you'll find the blood test parameters, the insights they provide and their corresponding values.

PUT IT IN PRACTICE

Additional information that will help you put your personalised recommendation into action.

HOW TO INTERPRET **MY GENETICS**

Genetic information comprises the set of instructions that are the starting point of all the body functions throughout our lives. Genetic variants are regions in the DNA that take different shapes in different people and can modify this starting point.

For each area of study you will find a table with the variants that were analysed:

GENE

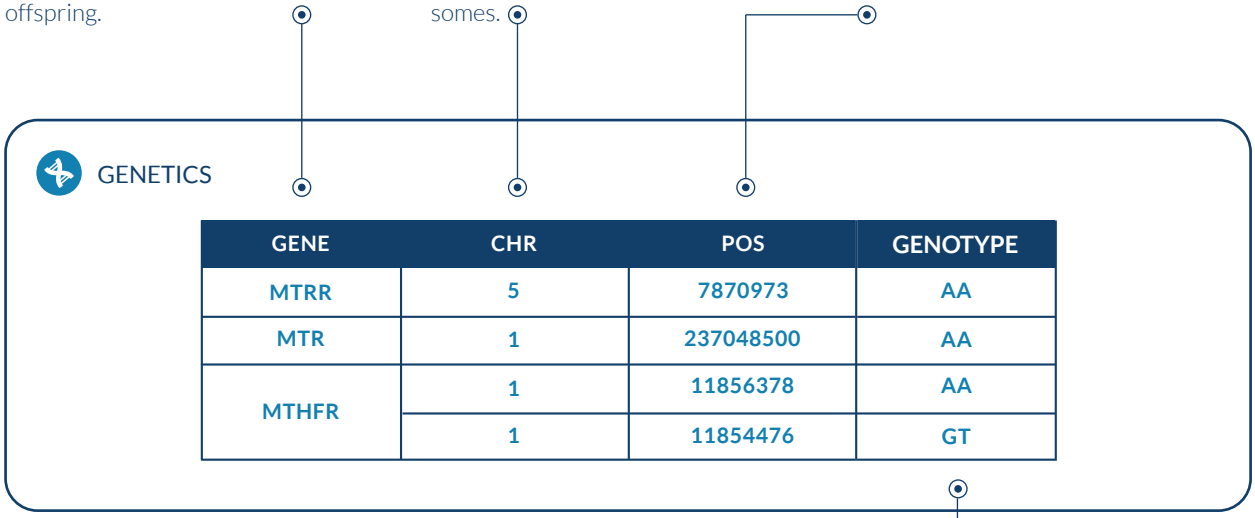
The gene where the variant is found. A gene is the basic physical unit of inheritance and is passed from parents to offspring.

CHR

The chromosome where the gene resides. The DNA molecule is not continuous, but rather divided into chromosomes.

POS

The specific position where the DNA sequence varies, of that chromosome.



GENOTYPE

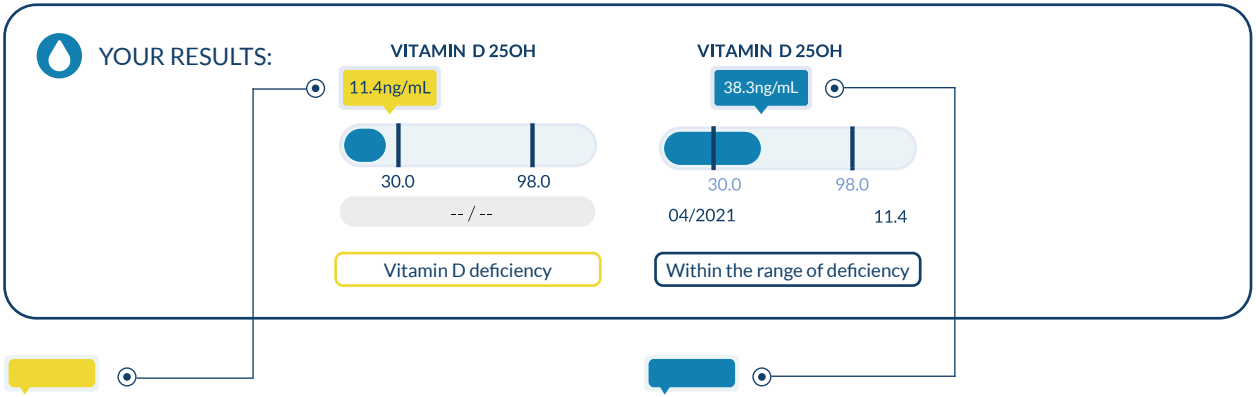
Your genotype is the concrete value of your variant. Genotypes are not "good" or "bad", but simply deviations from a reference that gives accurate information about how your body works.

HOW TO INTERPRET **MY BLOOD TEST RESULTS**

Blood tests are one of the most useful tools to know your current state of health. However, they can often be difficult to understand. At Made of Genes we make that easy for you!

REFERENCE VALUES FOR PARAMETERS IN BLOOD

In most cases, for it to be considered normal there must be a minimum amount present in the body, without exceeding a maximum limit. For instance, this is the case of vitamin D. However, for some parameters, only a minimal amount may be required, like happens with HDL cholesterol, or not going over a maximum value, as in the case of total cholesterol.



Analytical values outside the reference range indicate that your state of health in that study area may not be optimal.

Analytical values within the reference range indicate a good state of health in that study area, at this moment in time.

ADVANCED SPORT TEST

PHYSICAL ACTIVITY AND HEALTH

The incorporation of physical activity on a regular basis is part of any healthy lifestyle program. In addition to being one of the main elements involved in controlling body weight, regular exercise has also been shown to help prevent health problems related to the cardiovascular, endocrine and musculoskeletal systems, as well as the development of different types of cancer. The benefits of exercising are evident at all ages, as it can improve physical condition in general, and promotes healthy sleep, improves mood and increases energy.

Any sports activity must be based on three important pillars: training, nutrition and rest. Our individual characteristics and potential, determined to a great extent by our genetics, imply specific requirements in these areas. Therefore, it is important that physical activity is adapted to these aspects in order to guarantee safe practice and an optimal performance.

WHAT WILL YOU KNOW AFTER READING THIS GUIDE:

- What is your potential on a muscular level and how to use it to improve your performance
- What rest and recovery times do you need to avoid overtraining
- Your susceptibility to ligament or tendon injuries and what strategies are particularly important for you to prevent them
- What nutrients, supplements and their amounts can help you better recover and optimise your individual abilities


MUSCLE RESPONSE AND PERFORMANCE
RECOVERY AND INJURIES
AID FOR PERFORMANCE
NUTRITION IN SPORTS
AID TO RECOVERY

HEALTH GUIDE OF
NAME

LET'S GET STARTED!

DATE
31/03/2022

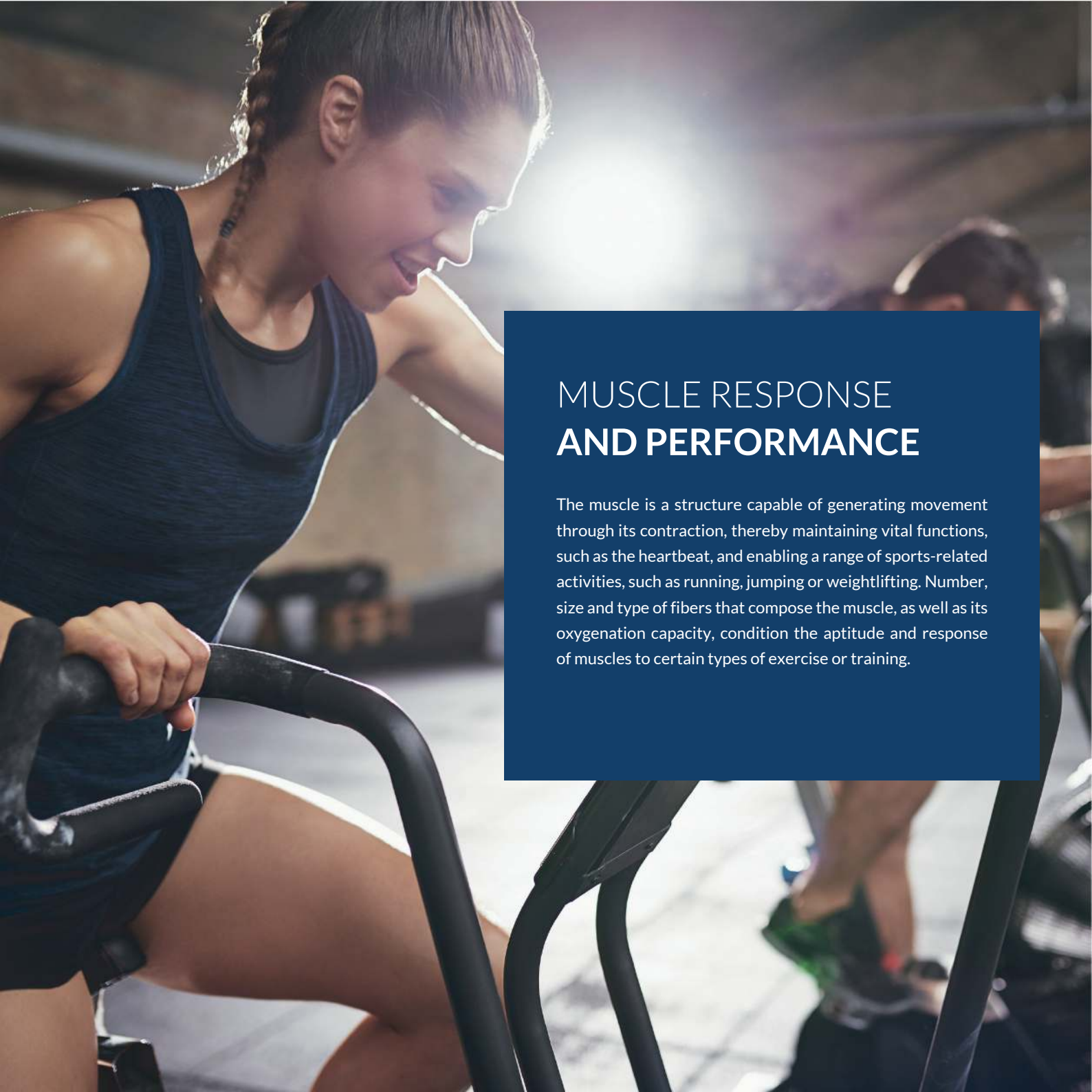
TAKE ACTION
These are the areas of study that require immediate action

MONITOR
Checking these areas periodically is advisable

KEEP IT UP
Your results are optimal in these areas, but do not neglect them

SUMMARY TABLE

AREAS AND STUDY ITEMS	TAKE ACTION	MONITOR	KEEP IT UP
MUSCLE RESPONSE AND PERFORMANCE			
RESPONSE TO POWER TRAINING			✓
RESPONSE TO ENDURANCE TRAINING			✓
MUSCLE OXYGENATION CAPACITY		✓	
RECOVERY AND INJURY			
OVERTRAINING AND MUSCLE DAMAGE		✓	
LIGAMENT AND TENDON INJURIES	✓		
PERFORMANCE IMPROVEMENT			
CAFFEINE	✓		
MAGNESIUM		✓	
TIPS FOR RECOVERY			
ANTIOXIDANTS			✓
DETOX RESPONSE		✓	
NUTRITION IN SPORTS			
OMEGA 3		✓	
B VITAMINS	✓		



MUSCLE RESPONSE **AND PERFORMANCE**

The muscle is a structure capable of generating movement through its contraction, thereby maintaining vital functions, such as the heartbeat, and enabling a range of sports-related activities, such as running, jumping or weightlifting. Number, size and type of fibers that compose the muscle, as well as its oxygenation capacity, condition the aptitude and response of muscles to certain types of exercise or training.

The striated muscle or skeletal muscle is made up of muscle fibers, whose contraction allows us to perform voluntary movements. In humans, there are three types of muscle fibers: slow-twitch fibers (type I), fast-twitch fibers (type IIb), and intermediate fast-twitch fibers (type IIa), which are a combination of slow- and fast-twitch fibers. Although most striated muscles are composed of several fiber types, there are individual differences in the proportion of the different types they contain. These variations are largely determined by genetic factors. A higher proportion of fast-twitch fibers implies a greater aptitude for explosive (speed) movements while a greater resistance is achieved when slow-twitch fibers are predominant. Training has the ability to transform the structure of some fibers into slow- or fast-twitching fibers.

In addition to the contraction type, the oxygen supply that a muscle receives at a given time also conditions its function and ability to perform different types of effort, particularly important during endurance exercises.

RESPONSE TO POWER TRAINING

RESPONSE TO ENDURANCE TRAINING

MUSCLE OXYGENATION CAPACITY

RESPONSE TO POWER TRAINING

Developing rapid muscle contraction is one of the most important qualities for strength and speed disciplines. The muscle fibers that are predominantly used for this type of exercise are the fast-twitch striated fibers (type IIb or white fibers), which obtain their energy through the anaerobic metabolism, i.e., without using oxygen. This type of fiber can generate more strength but fatigues easily. The proportion of type IIb muscle fibers partly determines the individual aptitude for strength and speed disciplines, as well as the most effective training programme for improving the athletic performance, independently of the sport that is practised.

ANALYZED MARKERS

GENETIC MARKERS: Analysis of genetic variants related to the proportion and characteristics of the striated muscle fibers.

GEN	CHR	POS	GENOTYPE
ACE	17	61566031	AG
ACTN3	11	66328095	TC
AGT	1	230845794	AG
IL6	7	22766645	CG
PPARA	22	46630634	GG
VEGF	6	43738350	CG

IMPORTANCE OF THE DIFFERENT TYPES OF MUSCLE STRENGTH

During any strength training, muscles must be subjected to a progressive overload that is specifically focused on the discipline practised and the individual needs of each athlete.

TYPE OF STRENGTH	OBJECTIVE	BENEFIT
Endurance Strength	Conditioning of muscles, tendons and ligaments	Ability to support high loads and to sustain continuous force
Maximum Strength	Increase maximum level of force possible	Improvement of effort economy
Explosive Strength	Increase maximum force per time unit	Optimisation of physiological mechanics of movements

WE RECOMMEND:

The result of the genetic study indicates that you have a high response capacity to power training, as you show a predisposition to fast-twitch fibers with a greater efficacy. To improve your athletic performance, we recommend you:

- As part of your exercise program aimed at enhancing muscle strength, conventional strength training (few repetitions and high loads) will allow you to improve your results significantly.
- Even if you practice endurance sports, add explosive strength training to your regular trainings programme. It will help you improve your muscle capacity and reduce the risk of injury.

IN PRACTICE...

The development of power (explosive strength) is important in all types of disciplines, like speed or endurance.

BASICS

High effort/weight
Fast-twitch muscle fibers are recruited during the exercise

Low number of repetitions
Prioritizing fiber strength, rather than increasing fiber size

Long rest between sets
Fast-twitch fibers recover more slowly

EXERCISES

- Clap push ups
- Burpees
- Box jump
- Jumps with weight
- Medicine ball throw
- Powerlifting
- Weightlifting
- Sprints

RESPONSE TO ENDURANCE TRAINING

Exercises of long duration and/or low intensity mostly activate the slow-twitch fibers (type I or red fibers). This type of fiber generates less strength but possesses a greater resistance to fatigue, since its energy metabolism uses oxygen for the oxidation of carbohydrates and fats. Although there is some evidence that training can modify the metabolism and the function of some fast- and intermediate-twitch fibers so that they act as slow-twitch fibers, it has been shown that adapting the training based on the proportion of type I fibers of each individual leads to a performance improvement in these disciplines.

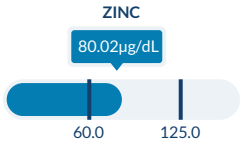
ANALYZED MARKERS

GENETIC MARKERS: Analysis of genetic variants related to the proportion and characteristics of striated muscle fibers.

GEN	CHR	POS	GENOTYPE
ACE	17	61566031	AG
ADRB2	5	148206473	CC
BDKRB2	14	96671139	CT
PPARA	22	46630634	GG
VEGF	6	43738350	CG

GEN	CHR	POS	GENOTYPE
ADRB2	5	148206440	GG
ADRB3	8	37823798	AA
GABPB1	15	50610792	AA
PPARGC1A	4	23815662	CT

BLOOD MARKERS (31/03/2022): Study of trace elements that are particularly relevant in resistance exercises.



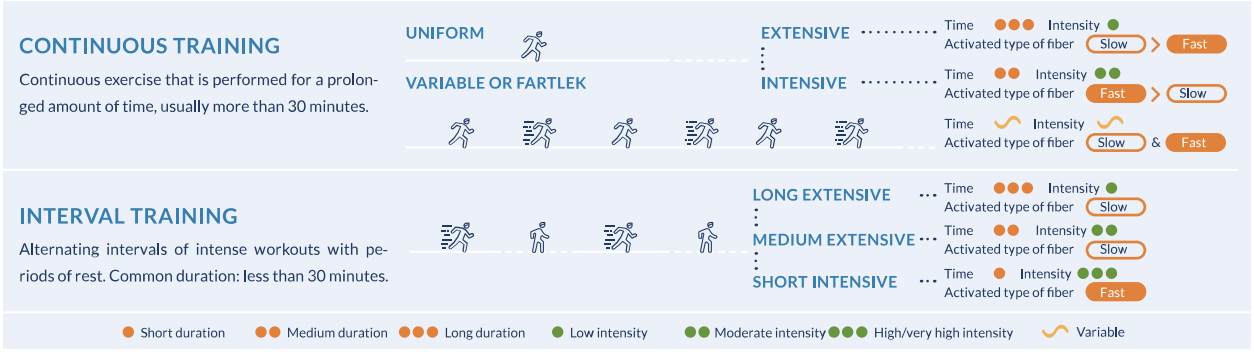
WE RECOMMEND:

Studying the genetic structure and efficiency of your muscles reveals that your response capacity to endurance training is low. As your zinc levels are currently normal, we recommend the following to improve your athletic performance:

- For planning your endurance training: a conventional ratio of high and low intensity sessions (continuous or interval) will help you to enhance your performance.

IN PRACTICE...

Endurance strength is developed through various exercises that activate the different types of fibers:



MUSCLE OXYGENATION CAPACITY

The performance in disciplines that require moderate levels of effort over a long period of time is directly related to our body's ability to carry oxygen to active muscles. The maximum volume of oxygen (VO₂ max) refers to the amount of oxygen that can be used by the body during physical exercise. The VO₂ max is determined by our genetics and provides information about a person's aerobic capacity. It also depends, among other factors, on how efficiently blood can be pumped into the tissues as well as the oxygen-carrying capacity of red blood cells.

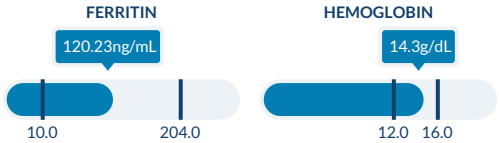
ANALYZED MARKERS

GENETIC MARKERS: Analysis of genetic variants that are associated with high VO₂ max values that contribute to a higher capacity of muscle oxygenation.

GEN	CHR	POS	GENOTYPE
ADRB2	5	148206440	GG
CRP	1	159682233	CT
GABPB1	15	50610792	AA
VEGF	6	43738350	CG

GEN	CHR	POS	GENOTYPE
ADRB2	5	148206473	CC
GABPB1	15	50621834	AA
PPARGC1A	4	23815662	CT

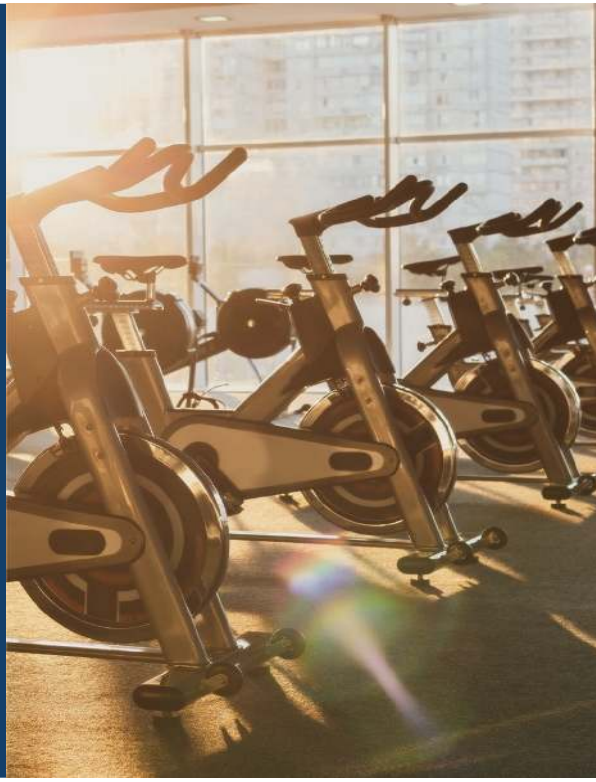
BLOOD MARKERS (31/03/2022): Analysis of biochemical markers related to the oxygen transport in the blood.



WE RECOMMEND:

You have a genetic predisposition to a medium-low VO2 max value, which means that your aerobic capacity is likely to have a more limited potential. However, biochemical oxygen transport markers show normal values. Overall, we recommend you:

- Include workouts focusing on quality and intensity (interval or series training) in your training programme, which will increase your anaerobic/lactate threshold and bring it closer to your VO2max value. It is important for you not to neglect this type of training.
- Working on the technical aspects of your discipline can also help you to be more efficient in your movements, which decreases oxygen consumption.



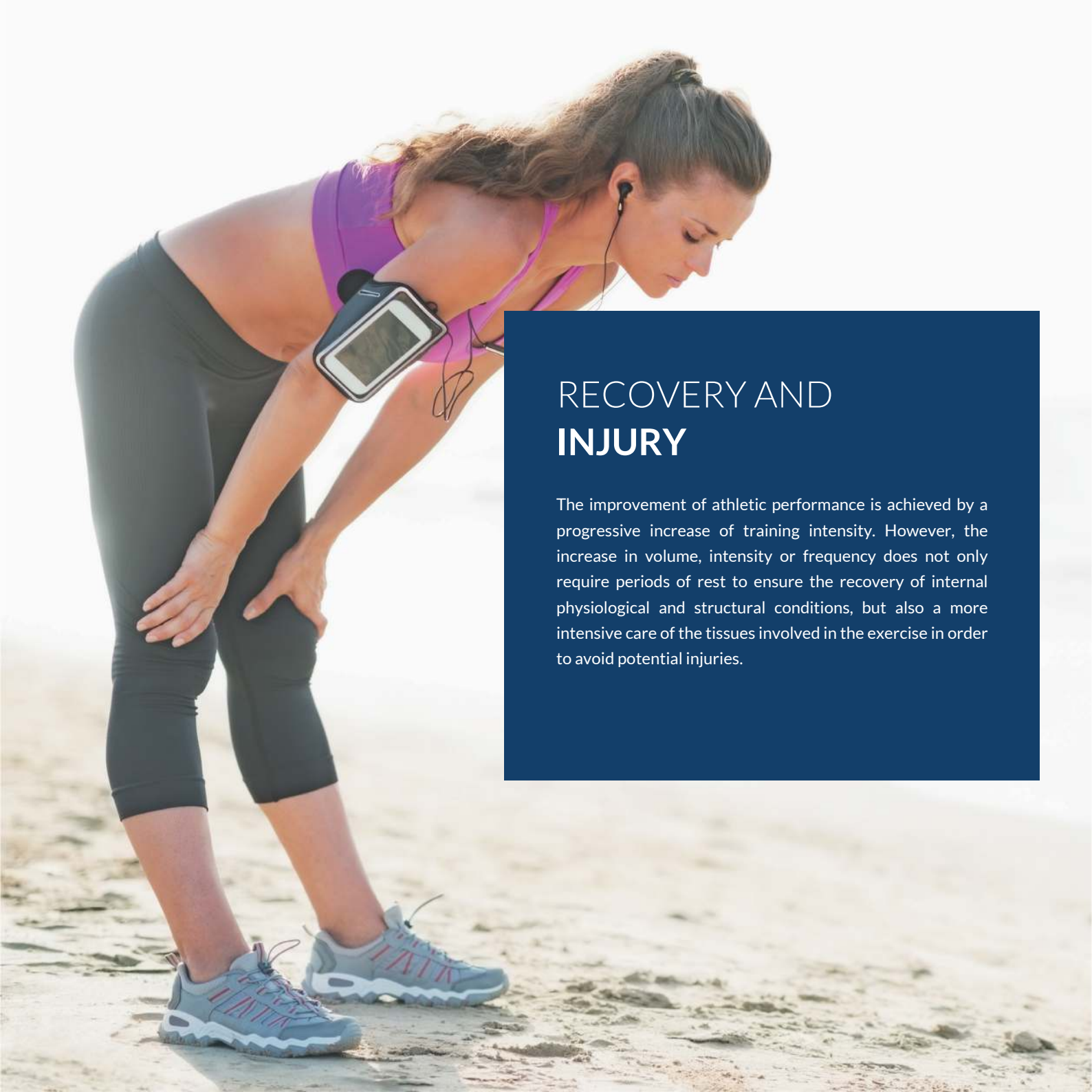
IN PRACTICE...

During the course of a physical activity, a certain intensity can be maintained over a long period of time, if oxygen is used for energy generation (aerobic pathway). The moment that muscles generate energy mostly anaerobically (without oxygen), an accumulation of lactic acid is produced, which causes a drop in intensity and performance. This point is called the lactate or anaerobic threshold, and its optimisation allows for the exploitation of the full potential of VO_2 max.

How to improve your lactate threshold?

*Lactate threshold (LT). Consult a coach to help you set this pace.

- Workout sessions of 20 to 60 minutes at LT pace*
- Fractionated periods or intervals: LT pace* + slow recovery jog + LT pace*
- High-intensity interval training (HIIT)



RECOVERY AND **INJURY**

The improvement of athletic performance is achieved by a progressive increase of training intensity. However, the increase in volume, intensity or frequency does not only require periods of rest to ensure the recovery of internal physiological and structural conditions, but also a more intensive care of the tissues involved in the exercise in order to avoid potential injuries.

Including exercises with a higher intensity than usual can cause an imbalance which the body identifies as a stressful stimulus. Consequently, the body responds to this change by trying to overcome this imbalance and inducing a muscle adaptation, if the stimulus is maintained. These two responses are natural and have commonly positive effects on the body. However, if the stimulus is too intense and the body does not get enough rest for adaptation, a state of physical fatigue is reached, which directly impacts performance. The time needed for recovery depends largely on physical condition, experience, environmental factors and nutrition, as well as an individual component that needs to be taken into account.

Moreover, it is important to remember that increased physical demands on muscles, tendons, ligaments and bones can elevate the risk of injury or rupture, especially in individuals who possess a certain predisposition.

For this reason, when planning a trainings programme, it is important to take this variability into account for optimal activity as well as sufficient recovery times.

OVERTRAINING AND MUSCLE DAMAGE

LIGAMENT AND TENDON INJURIES

OVERTRAINING AND MUSCLE DAMAGE

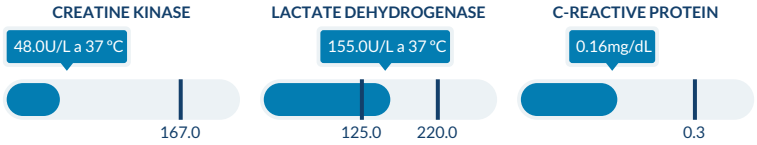
An accumulation of fatigue associated with physical activity can lead to a state known as overtraining. Muscle damage produced during exercise induces the release of pro-inflammatory substances called cytokines and molecules that cause oxidative stress. Although this response contributes largely to muscle regeneration, in the absence of adequate rest, it may be amplified, becomes chronic and pathological, causing manifestations throughout the body that diminish the overall performance. The ability to cope with inflammation is intrinsic to each person and can determine the individual susceptibility to overtraining.

ANALYZED MARKERS

GENETIC MARKERS: Analysis of genetic variants associated with the activity of cytokines and inflammatory proteins involved in the modulation of individual inflammatory responses.

GEN	CHR	POS	GENOTYPE
CRP	1	159682233	CT
IL6	7	22766645	CG
IL6R	1	154426970	AA
TNF	6	31543031	GG

BLOOD MARKERS (31/03/2022): Analysis of markers related to muscle damage, inflammation and the level of chronic fatigue in athletes.



WE RECOMMEND:

The genetic study shows that you have a low capacity for managing recovery processes after exercising, which increases the risk of overtraining and injury. However, the study of the respective biochemical markers shows adequate values. We recommend you:

- Due to your limited genetic capacity for recovery, it is important that you maintain adequate recovery times between your training sessions. As a general rule, wait 48 hours before working on the same muscle group again.
- As a preventive measure, incorporate foods with anti-inflammatory capacity into your diet, particularly during competition or at the end of the season. See the section on Omega 3.

IN PRACTICE...

Rest and recovery form, together with nutrition, the so-called invisible training. During this period the body assimilates the workout and promotes the regeneration of involved tissues, re-establishes hormonal balances and replenishes energy reserves. The follwing strategies will help you to enhance your recovery:

- Cool down and stretch properly after your workout.
- Take contrast showers (alternating hot and cold water) to improve circulation and to relax muscles and tendons.
- Cold baths help to remove waste products from the muscles after very intense exercises.
- Make sure to provide a good post-workout diet, including complex carbohydrates and proteins.
- Allow for sufficient hours of sleep.
- Practice relaxation techniques, such as yoga, on rest days.

LIGAMENT AND TENDON INJURIES

Ligaments and tendons are structures that are actively engaged in physical activity. Tendons connect muscles to bones and transmit the mechanical force of muscle contraction to the bones to produce movement, while ligaments connect and stabilize bone segments, such as joints. Both structures are largely composed of collagen, which means that the production of this protein is crucial for maintaining stability, flexibility and elasticity. Individual factors can result in a lower production of collagen, which may increase the susceptibility to develop injuries. This is a reason for incorporating targeted exercises that focus on the prevention of injuries.

ANALYZED MARKERS

GENETIC MARKERS: Analysis of genetic variants related to collagen synthesis, associated with a greater susceptibility to lesions in these structures.

GEN	CHR	POS	GENOTYPE
COL1A1	17	48277749	CC
COL5A1	9	137734416	TT
GDF5	20	34025983	AG

JOINT MOBILITY AND ATHLETIC PERFORMANCE

Ligaments and tendons are both made up of so-called fibrous connective tissue, which plays an important role in the amplitude of movement and joint mobility. The resistance experienced during stretching is accentuated by cross-links between the collagen fibers that form this tissue. These links are increased by factors such as lack of physical exercise, ageing or dehydration. Maintaining the elasticity of these structures is crucial for preventing injuries and optimising athletic performance.

HEALTHY TENDONS AND LIGAMENTS

Stabilisation, guidance of relative movements and control of maximum range of movements.

Allowing for elastic energy to be stored which, when returned, conserves muscle work and reduces metabolic energy cost of movement.

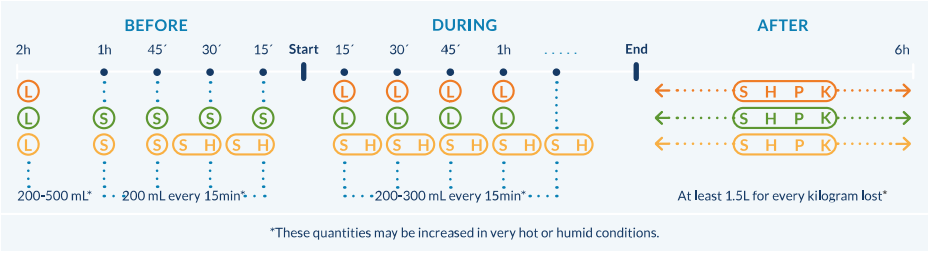
WE RECOMMEND:

Your genetic test indicates that you have a higher risk of injury in this type of structures, so we recommend:

- Respect the recovery periods, especially when competing or exercising at a high intensity. Also, warm up properly for good joint mobility.
- Prioritise eccentric exercises, which improve tendon elasticity, over plyometric exercises, which improve muscle power.

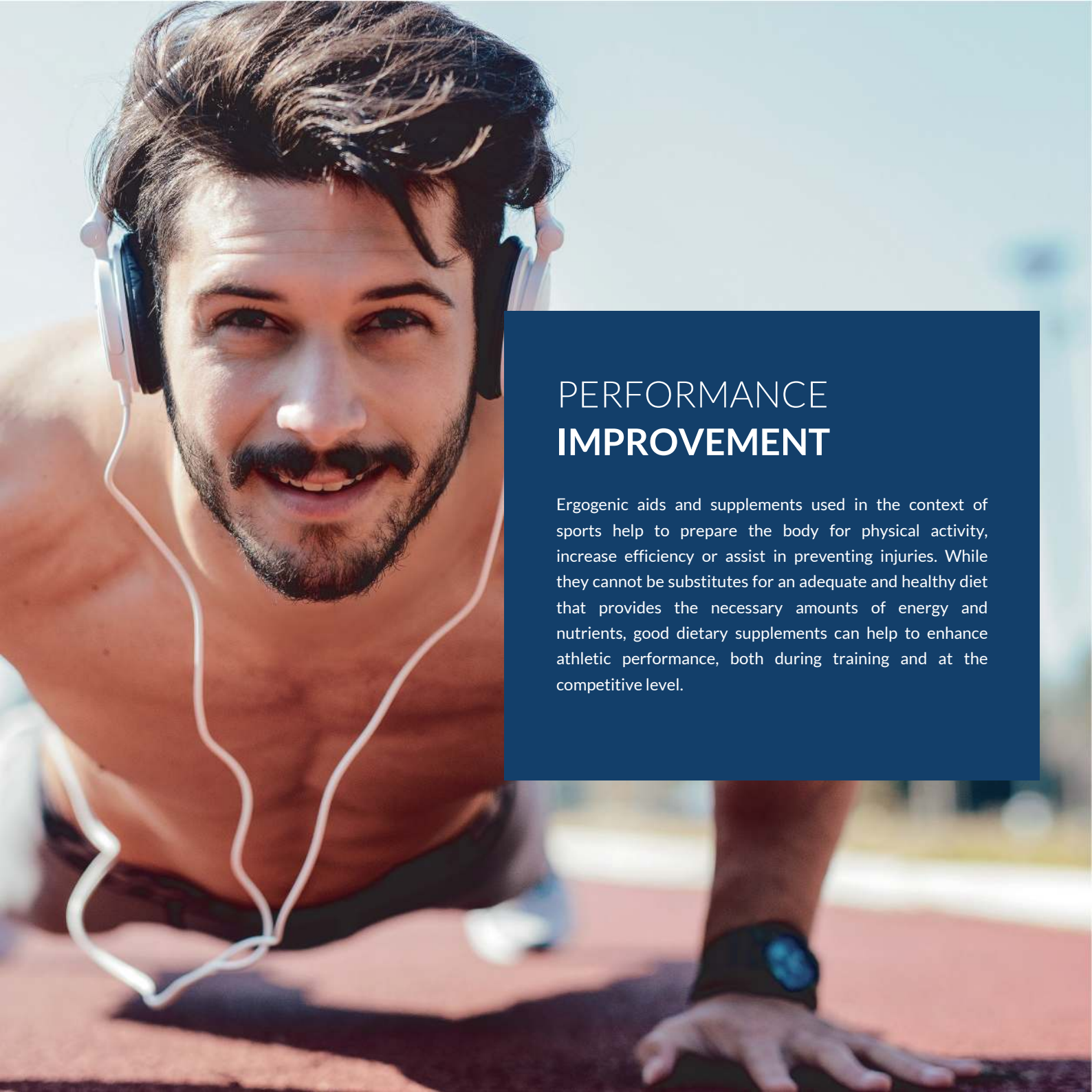
IN PRACTICE...

Hydration is particularly important when it comes to sports, as the need for fluids increases substantially. Tendons and ligaments are poorly vascularised and are, therefore, very sensitive to the hydration status. Stay hydrated during the day (a pale urine colour over the day is a good indicator for hydration) and add extra fluids when exercising:



- (L) Fluids
- (S) Sodium containing beverages
- (H) Carbohydrate containing beverages
- (P) Protein containing beverages
- (K) Potassium containing beverages

- Low temp. and humidity < 1h time
- Exercises > 1h time
- Heat and high humidity > 1h time



PERFORMANCE **IMPROVEMENT**

Ergogenic aids and supplements used in the context of sports help to prepare the body for physical activity, increase efficiency or assist in preventing injuries. While they cannot be substitutes for an adequate and healthy diet that provides the necessary amounts of energy and nutrients, good dietary supplements can help to enhance athletic performance, both during training and at the competitive level.

Almost every organ and system in the body is involved in physical exercise. The muscular system, for instance, performs the motor actions ordered by the nervous system, involving not only the cardiovascular but also pulmonary, endocrine and renal systems, among others, which are fundamental for the support of this tissue. The use of ergogenic substances allows for an optimal functioning of these systems and contributes to the replacement of elements lost during exercise. Eventually, these substances enhance the physical capacities while reducing the probability of fatigue, injury or illness. Like the basic diet, the use of such substances is subject to several intrinsic factors of the athlete, such as age, initial physical condition, and extrinsic factors, such as the type of activity performed, intensity, duration, season and external environmental conditions. In addition, there is a certain inter-individual variability defining the need, impact or timing of these substances to improve the capacities of each individual.

CAFFEINE

MAGNESIUM

CAFFEINE

Caffeine is an alkaloid substance found in certain plants that acts as a stimulant for the central nervous system. It increases alertness and neurocognitive performance through various mechanisms of action, especially in times of sleep deprivation. In addition, it is capable of improving athletic performance through a greater release of neurotransmitters and adrenaline, by altering the use of energy substrates, increasing the release of ions at the cellular level and even reducing pain perception. The magnitude of the effect on the performance differs widely among individuals due to differences at the genetic level and environmental factors.

ANALYZED MARKERS

GENETIC MARKERS: Analysis of genetic variants related to the caffeine metabolism rate and capacity.

GEN	CHR	POS	GENOTYPE
ADORA2A	22	24837301	TT
CYP1A2	15	75041917	CA

THE IMPORTANCE OF THE PERSONALISED DOSE

Caffeine can lead to an increase in athletic performance through a number of different mechanisms. Yet, a high consumption can also produce adverse effects. Therefore, adjusting the caffeine dose to the individual needs of each athlete can help to reduce unwanted effects while maintaining the desired ergogenic effects.

IMPACT ON PERFORMANCE

- Fat mobilisation.
- Prevention of glycogen depletion.
- Improved recovery.
- Lower heart rate at submaximal exercise.

SIDE EFFECTS

- Sleep problems and anxiety.
- Gastrointestinal problems.
- Muscle cramps.
- Dehydration.

WE RECOMMEND:

The genetic analysis indicates that caffeine is inefficient at improving your athletic performance. In addition, an excessive intake is likely to increase your anxiety, as well as affect your health and rest, so we recommend you:

- Use moderate doses of caffeine (4-5 mg/kg body weight) before a workout or competition.
- You can try higher doses (8 mg/kg), which will probably improve your performance significantly, but can impair your rest and increase your anxiety. Therefore, avoid increasing the dose in the evenings or during a competition.

IN PRACTICE...

A broad variety of foods and supplements contain caffeine. Although the content may vary depending on a few attributes, such as the manufacturing process and the brand, these are the approximate quantities that can be found in the following products:

- Espresso coffee (134 mg/100 mL)
- Coffee (Italian coffee maker) (44.5 mg/100 mL)
- Concentrated caffeine drink (150 mg/59 mL)
- Caffeine pills (200 mg/pill)
- Dark chocolate (10 -50 mg/60 g per serving)
- Green tea (15 mg/100 mL)
- Black tea (22 mg/100 mL)
- White tea (11 mg/100 mL)
- Guarana-based drink (30 mg/330 mL)
- Cola drinks (49 mg/330 mL per can)
- Energy drink (80 mg/250 mL per can)
- Energy gel (25 - 50 mg/40 g per dose)

MAGNESIUM

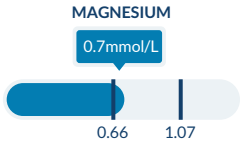
Magnesium is involved in multiple functions such as DNA and protein synthesis, reproduction and regulation of blood pressure, among many others. This mineral is also involved in muscle contraction, and a deficiency can cause muscle cramps that are characterised by sudden and involuntary contractions of one or more muscles. During physical activity, magnesium is lost through sweating, which increases the risk of cramps, especially in warmer conditions. Maintaining adequate levels of magnesium depends on the individual's ability to incorporate it into the body through the diet, a characteristic that is largely determined by genetics.

ANALYZED MARKERS

GENETIC MARKERS: Analysis of genetic variants related to the individual capacity of magnesium absorption by the intestine and kidneys.

GEN	CHR	POS	GENOTYPE
ATP2B1	12	90273927	GT
TRPM6	9	77472066	GG

BLOOD MARKERS (31/03/2022): A magnesium test is performed to measure the amount of magnesium in your blood.



WE RECOMMEND:

The genetic analysis shows that a balanced diet may not be enough for you to maintain adequate levels of this mineral. However, since the analysis of the magnesium levels shows normal values at this point, we recommend you:

- To compensate for your genetic predisposition to low levels of magnesium, ensure a dietary intake of 400 mg of magnesium per day.
- The use of magnesium supplements may be advisable at times of high exercise load during the season, but a regular use is not recommended. Consult a professional to discuss this option.

IN PRACTICE...

Magnesium is found in many different foods. However, it is important to mention that the cooking method can diminish the content of this mineral. For instance, vegetables lose significant amounts of magnesium when being boiled.

- Spinach (87 mg/100 g)
- Tuna (64 mg/100 g)
- Brown rice (44 mg/100 g)
- Avocado (29 mg/100 g)
- Pumpkin seeds (550 mg/100 g)
- Dark chocolate (85% cocoa) (228 mg/100 g)
- Almonds (270 mg/100 g)
- Skimmed yogurt (19 mg/100 g)
- Sunflower seeds (325 mg/100 g)
- Raw chard (81 mg/100 g)
- Flaxseed (392 mg/100 g)
- Wheat bran (622 mg/100 g)

TIPS FOR **RECOVERY**

Periods of rest are essential components of any workout programme. Apart from limiting muscle activity and manual therapies, there are different nutritional strategies to accelerate and improve the recovery process. Overall, a good recovery allows for a better assimilation of the training loads, which directly impacts the performance.

Our organism possesses various mechanisms to neutralise the effects of free radicals generated during the physical exercise. The efficiency of these internal mechanisms is determined by certain genetic variations. Some of which provide less protection and demand consequently a greater amount of nutrients that can compensate for this inefficiency and help the organism recover after training.

These mechanisms include a first line defence at the cellular level, which prevents and suppresses the formation of free radicals in the cells of our organism. In addition, a second line of defence exists that acts mainly at the hepatic level by neutralising oxidised molecules through the binding of molecules with high antioxidant power such as glutathione.

ANTIOXIDANTS

DETOX RESPONSE

ANTIOXIDANTS

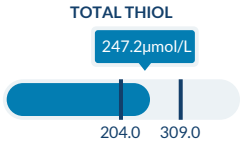
The enzymes superoxide dismutase, catalase, and glutathione peroxidase, act inside and outside the cells, where they transform free radicals into other substances such as water and oxygen. This reaction takes place both at rest and during exercise, although it is accentuated during the latter through an increased production of free radicals. The efficiency of these enzymes is determined by genetic factors that define the individual response to oxidative stress. Although a certain degree of oxidative stress can improve the efficiency of this system, an excess can produce negative effects in the body that will affect its performance.

ANALYZED MARKERS

GENETIC MARKERS: Analysis of genetic variants related to the enzymatic activity of superoxide dismutase, catalase, and glutathione peroxidase.

GEN	CHR	POS	GENOTYPE
CAT	11	34460231	CT
GPX1	3	49394834	GG
GPX4	19	1106615	CT
SOD2	6	160113872	GG

BLOOD MARKERS (31/03/2022): Assessment of the intrinsic antioxidant capacity, which indicates the individual protection status.



WE RECOMMEND:

Your genetics provides you with efficient internal mechanisms to prevent oxidative damage. In addition, your test results show that you have an adequate antioxidant capacity at this point. Even so, we still recommend you:

- Incorporate sufficient amounts of antioxidant foods into your diet.
- Adapt the consumption of this type of food to those situations in which you may need an extra supply, such as periods of high stress or increased physical activity.

IN PRACTICE...

To ensure the right supply of antioxidants, include foods in your meals that contain this type of nutrient. Make sure to integrate antioxidants regularly into your diet, rather than consuming them only occasionally.

ANTIOXIDANT-RICH FOODS

- Walnuts
- Dried Blueberries
- Goji berries
- Blackberries
- Artichoke
- Broccoli
- Mushrooms
- Legumes
- Strawberry
- Peach
- Grapes
- Citrus fruit

DETOX RESPONSE

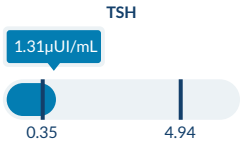
During exercise, waste products generated in the body are elevated due to an increased cell metabolism. The detoxification of these substances is performed at the hepatic level. Some genetic variants may predispose to an inefficient detoxification system, consequently contributing to the accumulation of intermediate products such as free radicals. Some foods, such as vegetables of the cruciferous family, contain substances that can be transformed into glucosinolates. These compounds stimulate the activity of enzymes involved in this process; thereby, accelerating the detoxification process so that toxic compounds remain less time in the body.

ANALYZED MARKERS

GENETIC MARKERS: Analysis of genetic variants that are associated with the efficiency of glutathione s-transferases, the group of enzymes that act in phase II of liver detoxification.

GEN	CHR	POS	GENOTYPE
GSTM1	1	110252472	AA
GSTT1	22	24376822	del

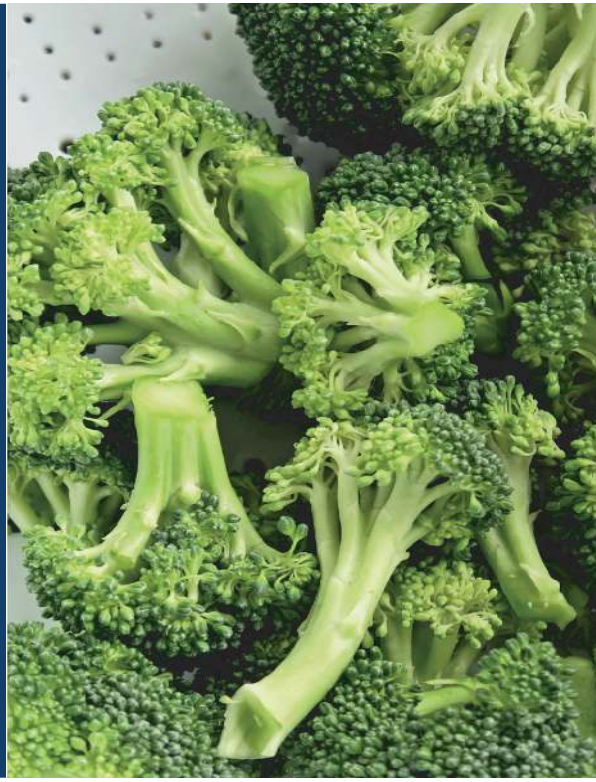
BLOOD MARKERS (31/03/2022): We analyse the thyroid function, as it may be compromised by a high consumption of glucosinolates.



WE RECOMMEND:

The genetic study shows that your phase II enzymatic machinery responsible for detoxification has a reduced efficiency. Due to this limitation the intake of cruciferous vegetables is particularly important for you. As your thyroid function markers show normal values, we recommend you:

- Eat cruciferous vegetables 3-4 times a week to compensate for the deficiency in your phase II detoxification processes.
- It is also recommended to add vegetables of the genus *allium*, such as garlic and onion, to your diet.

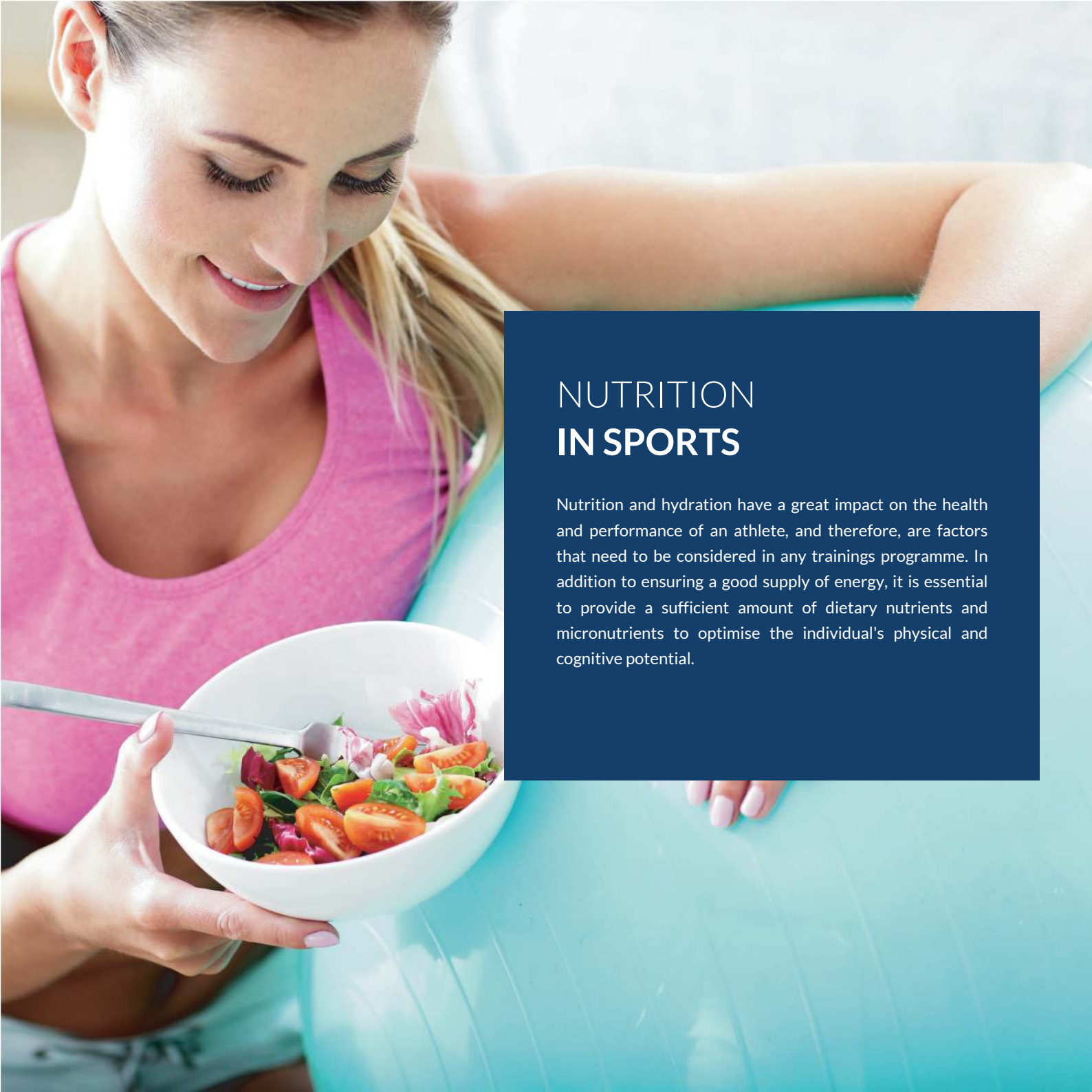


IN PRACTICE...

The best way of preserving the maximum amount of glucosinolates present in cruciferous vegetables is to steam them for about 4 to 5 minutes.

CRUCIFEROUS VEGETABLES

- Rocket
- Radish
- Turnip
- Cabbage
- Broccoli
- Red cabbage
- Cauliflower
- Brussels sprouts
- Romanesco
- Collard
- Kale
- Broccolini



NUTRITION
IN SPORTS

Nutrition and hydration have a great impact on the health and performance of an athlete, and therefore, are factors that need to be considered in any trainings programme. In addition to ensuring a good supply of energy, it is essential to provide a sufficient amount of dietary nutrients and micronutrients to optimise the individual's physical and cognitive potential.

Following a healthy and balanced diet according to the individual needs is essential for maintaining the fundamental body functions of each person. In the context of sports, this is particularly relevant as energy and nutritional requirements are increased due to a higher demand and an accelerated metabolism. In addition to providing adequate amounts of macronutrients (carbohydrates, fat and proteins), which serve as energy substrates during the exercise, it is crucial to avoid deficiencies of micronutrients that play a major role in processes involved in energy metabolism. On the other hand, the presence of nutrients that minimise inflammation induced by physical activity and improve the function of other systems, which are also significantly affected by exercise, such as the immune system, will allow for working out without health risks.

Although more focus is often placed on improving the physical capabilities through training, nutrition is a key element that allows for the performance enhancement of every athlete, irrespective of his or her level.

OMEGA 3

B VITAMINS

OMEGA 3

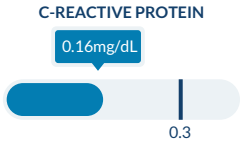
Omega-3s are essential polyunsaturated fatty acids responsible for numerous cellular functions: they reduce inflammation, regulate blood pressure, platelet function, glucose tolerance, and are involved in the development and maintenance of functions of the nervous system. During physical activity in which intense exercise increases oxidative stress and inflammation, they can provide benefits by attenuating the generation of free radicals while enhancing muscle performance and immune function. Although everyone can benefit from these effects, individuals with more pronounced inflammatory responses may experience a greater improvement in their performance.

ANALYZED MARKERS

GENETIC MARKERS: Analysis of genetic variants related to the individual tendency towards inflammatory processes.

GEN	CHR	POS	GENOTYPE
CRP	1	159682233	CT
IL6	7	22766645	CG
NOS3	7	150696111	GT
TNF	6	31543031	GG

BLOOD MARKERS (31/03/2022): Analysis of biochemical markers that reflect the inflammatory state of the organism.



WE RECOMMEND:

The analysis reveals a genetic tendency to inflammation, which means that it is probably more difficult for your body to recover from inflammatory processes. Although the study of your biochemical markers shows a low state of inflammation at this point, we still recommend you:

- Follow a diet that provides you with about 2 g of omega-3 fats per day, thus, facilitating a sufficient amount in your body to help prevent inflammatory processes.
- Check your inflammation levels periodically.

IN PRACTICE...

The following foods, among others, will provide you with the required amounts of omega-3 fatty acids. You can choose from a variety of animal and plant foods as well as supplements.

PLANT SOURCES

- Avocado (0.1 g/100 g)
- Rolled oats (0.1 g/100 g)
- Brussels sprouts (0.09 g/100 g)
- Walnuts (9 g /100 g)
- Flaxseed (6.4 g/100 g)
- Tofu (0.5 g/100 g)

ANIMAL SOURCES

- Herring (2.4 g/100 g)
- Mackerel (1.3 g/100 g)
- Sardines (1.4 g/100 g)
- Oysters (0.7 g/100 g)
- Salmon (2.3 g/100 g)
- Anchovies (1.5 g/100 g)

B VITAMINS

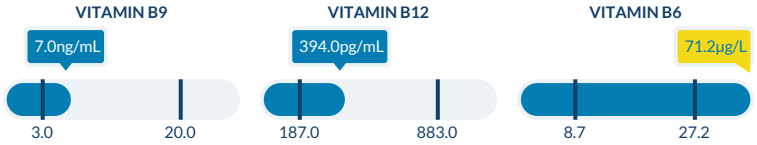
B vitamins, especially B6, B9 and B12, are involved in the conversion of proteins and carbohydrates into energy, as well as in the creation and regeneration of cells, including red blood cells. Physical exercise produces stress and changes in tissues, which implies a greater necessity of these nutrients for repairing affected tissues and maintaining a high percentage of lean body tissue. The needed amount of B vitamins depends on both the intensity of the training and the individual's efficiency in incorporating these vitamins into the diet, which is determined by genetic factors.

ANALYZED MARKERS

GENETIC MARKERS: Analysis of variants related to the transport and function of B vitamins.

GEN	CHR	POS	GENOTYPE
MTHFR	1	11854476	TT
MTHFR	1	11856378	GG
MTR	1	237048500	AA
MTRR	5	7870973	AA

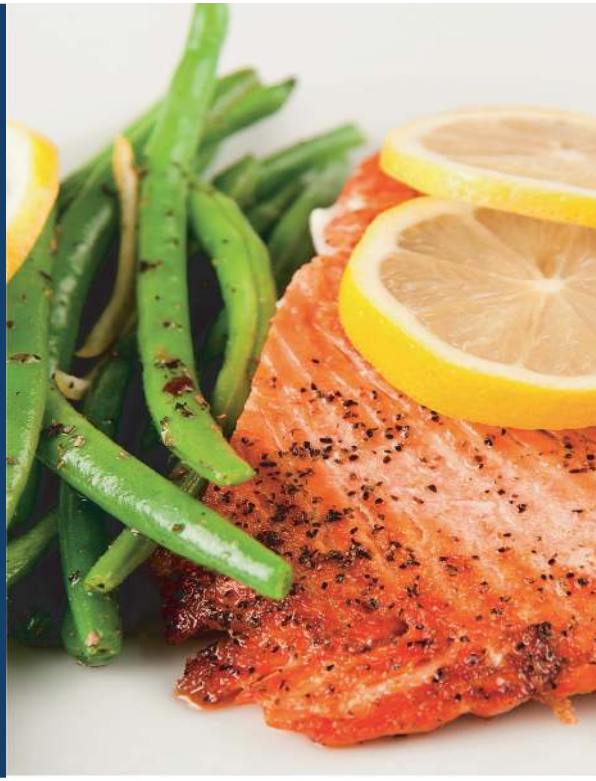
BLOOD MARKERS (31/03/2022): Analysis of the levels of B vitamins that are particularly relevant for athletic performance.



WE RECOMMEND:

The study of your genetics indicates that a balanced diet should be enough to obtain the recommend daily intake of vitamins B6-B9-B12. Since the analysis of your B vitamin levels shows values higher than normal, we recommend you:

- Discuss your biochemical values with a health care professional for a thorough assessment.
- Once you recover normal levels, ensure the following recommended intake. If your physical activities are of low intensity: vitamin B6 2 mg/day, vitamin B9 0.4 mg/day, vitamin B12 4 µg/day. For high-intensity exercises: vitamin B6 4 mg/day, vitamin B9 0.5 mg/day, vitamin B12 5 µg/day.



IN PRACTICE...

B vitamins can be found in a wide variety of foods.

B6

- Salmon (0.75 mg/100 g)
- Cooked lentils (0.65 mg/100 g)
- Tuna (0.40 mg/100 g)
- White beans (0.46 mg/100 g)

B9

- Endive (0.11 mg/100 g)
- Broccoli (0.11 mg/100 g)
- Green asparagus (0.11 mg/100 g)
- Spinach (0.14 mg/100 g)

B12

- Sardine (8.50 µg/100 g)
- Cured cheese (1.50 µg/100 g)
- Chicken egg (2.50 µg/100 g)
- Mussel (8.00 µg/100 g)

AREAS TO TAKE ACTION		
LIGAMENT AND TENDON INJURIES		
CAFFEINE		
B VITAMINS		

AREAS TO MONITOR		
MUSCLE OXYGENATION CAPACITY		
OVERTRAINING AND MUSCLE DAMAGE		
MAGNESIUM		
DETOX RESPONSE		
OMEGA 3		

Altered Normal

MY NOTES

ANALYSED BIOCHEMICAL MARKERS

- **ZINC:** An essential dietary element necessary for the function of a large number of enzymes as well as for protein and DNA synthesis. Zinc deficiency impairs cell renewal and growth.

- **HEMOGLOBIN:** The protein responsible for transporting oxygen from lungs to tissues and returning carbon dioxide from tissues to lungs. In addition, it is involved in the pH regulation of the blood. This molecule is found in red blood cells and requires iron to function properly.

- **FERRITIN:** The main protein in charge of storing iron in different tissues, such as the liver, spleen, intestinal mucosa and bone marrow. Its presence in the blood reflects the amount of iron stored in the body.

- **C-REACTIVE PROTEIN (HS-CRP):** Measurement of this protein is used to identify low levels of inflammation in the body. It commonly increases in response to infection, surgery, or trauma and is a valuable risk marker of cardiovascular disease.

- **LACTATE DEHYDROGENASE (LDH):** An enzyme that participates in the anaerobic energy metabolism, it converts the pyruvate that comes from glycolysis into lactate. A considerably elevated concentration in the blood indicates muscle damage.

- **CREATINE KINASE (CK):** An enzyme necessary for muscle function in the heart and skeletal muscles. Its concentration in the blood increases as result of the breakdown of striated muscle fibers caused by intense exercise or any condition that causes muscle damage.

- **MAGNESIUM:** A mineral involved in several important processes in the body, including energy metabolism, cardiorespiratory function and neuromuscular transmission. It contributes to the reduction of fatigue and tiredness.

- **TOTAL THIOLS:** Plasma thiols are antioxidants with the capacity to eliminate free radicals that cause oxidative stress. Their concentration is an indicator of the antioxidant status of the organism.

- **TSH:** A hormone produced in the pituitary gland that controls the production of thyroid hormones in the thyroid gland.

- **VITAMIN B6:** TAlso called pyridoxine. It is required for protein metabolism and the production of neurotransmitters.

It also contributes to the maintenance of adequate energy levels and reduces fatigue.

- **VITAMIN B9:** Also known as folic acid or folate. It is essential for protein metabolism, DNA replication, cell growth and cell division, and the formation of blood cells. It contributes to the reduction of fatigue and tiredness.

- **VITAMIN B12:** Vitamin B12 or cobalamin is essential for DNA and protein synthesis, the formation of red blood cells and neurotransmitters such as serotonin. It is also involved in the release of energy and contributes to the reduction of fatigue.

GLOSSARY OF TERMS

A

ANAEROBIC METABOLISM: A catabolic process used by cells to produce energy from nutrients in the absence of oxygen, known as fermentation. The most characteristic ones include the conversion of glucose into lactic acid (lactic fermentation) and into alcohol (alcoholic fermentation).

C

CATALASE ENZYME: Enzyme largely found in various parts of the body; whose activity varies depending on the tissue. It is well-known for its antioxidant power.

CELL: The smallest unit that can exist on its own. In multicellular organisms, such as humans, they group together to form body tissues.

COLLAGEN: Major protein component of skin, tendons, cartilage, bone and connective tissue. Its essential function is the support of the body's unity. It provides stability to the connective tissue.

E

ENZYMES:: Complex proteins, which facilitate or accelerate specific chemical changes, that are necessary for many of the body's functions. They assist, for example, in the digestion of food so that the body can make use of it.

ERGOGENIC AIDS: Nutritional, pharmacological and psychological substances used by athletes to increase energy, performance and recovery. Ergogenic aids include amino acids, bee pollen, protein powder, glucosamine, caffeine, among others.

F

FREE RADICALS: A highly reactive chemical species that is produced during the cell metabolism (chemical changes that occur in a cell). Free radicals can accumulate in cells and damage other molecules, such as DNA, lipids and proteins. This damage can increase the risk of cancer and other diseases.

G

GLUCOSINOLATES: Components present in vegetables, particularly in vegetables of the cruciferous family, including broccoli, cauliflower, mustard, horseradish. Their characteristics including having regulatory functions in inflammation, stress response, antioxidant activities, as well as antimicrobial and anti-cancer properties.

GLUTATHION: An antioxidant peptide (a short chain of amino acids) found in various tissues. It performs many functions in the cell, including the activation of certain enzymes and the destruction of toxic compounds and oxygen-containing chemicals.

GLYCOGEN: A multibranched polysaccharide of glucose, which can be used to obtain energy quickly. The largest glycogen stores are found in liver and muscle.

J

JOINTS: Areas where two or more bones meet, allowing for the movement of the different body parts. They are made up of connective tissue and cartilage.

M

MUSCLE FIBER: A cell that forms the muscle tissue. There are different types of muscle fibers in the human body that differ in colour, metabolism and functional properties. Type I fibers are reddish in appearance and are characterised by slow contraction. They develop little strength and are very resistant to fatigue. Type IIb fibers are whitish in appearance, contract quickly and develop a high level of strength, but fatigue quickly. The appearance of Type IIa fibers is an intermediate between the two previous ones, their contraction is fast, but they have some resistance to fatigue.

METABOLISM: A set of chemical reactions that take place in the cells of the body. These reactions produce the energy and materials that cells, and organisms need to grow, reproduce, and remain healthy. They also help process and eliminate toxic substances. The metabolic system is divided into two combined processes: genetic growth of new structures (anabolism) and breakdown of food or reserves for transformation into energy (catabolism).

O

OXIDATIVE STRESS: A condition characterised by an imbalance between free radicals and antioxidants in the body. The presence of more free radicals than can be balanced with antioxidants can cause free radicals to damage fatty tissue, DNA and proteins in the body.

P

PLYMETRICS: Physical training that consists of exercises that exert muscles to their maximum force in short time intervals (in an explosive manner).

S

STRIATED OR SKELETAL MUSCLE: Composite muscle tissue that has a particular form and appearance, presenting as a series of bands visible along the muscle fibers, responsible for striated appearance when viewed under the microscope. The striated muscle is directly connected to the central nervous system. As a voluntary muscle it is under conscious control and can produce movements according to our will. Striated muscles are generally connected to the bones through tendons, except for those in the eye, upper esophagus, or tongue.

SUPEROXIDE DISMUTASE ENZYME: Enzyme present in the organism that is known for its antioxidant power. It acts as a defense mechanism against damage caused by free radicals.

T

TRACE ELEMENTS: Also called "oligoelements", are minerals present in small quantities in the tissues. Their main function is enzyme catalysis.

W

WEIGHTLIFTING: Sports discipline that consists of strength training, whose exercises are based on lifting weights. Today, weightlifting is the basis of preparation for most sports.

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