

# NUTRIFIT

*Premium*

*Nutrigenetic analysis*

Sample report

ID: 000000





### Hello there,

We congratulate you on an important step that you have made towards self-discovery. The better you know yourself, the easier you can influence your body weight, youthful look, fitness and health. As its your genes that determine the response of your metabolism and muscles, your personal DNA analysis will allow you to optimise your eating habits and exercise routine in order to reach your goals much more easily. We believe that with carefully prepared, personalised recommendations, our experts will justify the trust that you have invested in us.

We are happy to be able to follow you on this exciting journey where you will, with the help of your personal DNA analysis, finally discover how your body functions. The secret to the success that your personal DNA analysis will lead you to is hidden in the personalised diet and lifestyle plan, in which all the needs that your genes determine are taken into consideration.

The analysis of your genes is performed according to the highest quality standards. In the first stage, on the basis of relevant scientific literature, we submit the genes to rigorous selection where, from among many, we chose only those for which the influence has been proven, and for which there is enough reliable evidence and quality scientific research. We perform the analysis in a laboratory which operates according to the ISO's quality standards, where we analyse your DNA using an extremely reliable and most advanced technology. In addition, nutritional experts create expert nutritional and lifestyle recommendations, especially for your genetic makeup.

It is precisely our high-quality standards that guarantee reliable results of the DNA analysis. Or, as the head of the Chair of Pharmaceutical Biology, prof. Borut Štrukelj, M. Pharm., Ph.D., says:

*"The personal DNA analysis reveals surprising information which has not been known to us so far. It enables the individual to start eating and training according to his/her genetic makeup. He/she, therefore, ingests only what his/her body needs, and selects a training regimen, which, according to his/her genetic makeup, suits him/her the most."*

prof. Borut Štrukelj, M. Pharm., Ph.D., The Faculty of Pharmacy, University of Ljubljana

We are convinced that your personal DNA analysis will lead you to appropriate eating habits, a healthier lifestyle, better well-being and, consequently, a better personal appearance. We would like you to know that your personal DNA analysis does not contain any pathological diagnoses, and we recommend that you consult your personal doctor in case of any bigger changes to your eating habits.

You, yourself, are the key to the final success of your DNA analysis, and we, therefore, advise you to follow the recommendations and practise them responsibly. You are about to discover surprising information about yourself that will help you make the best of the potential that Mother Nature has given you.

*GenePlanet team*



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## THE INFLUENCE OF DIET ON BODY WEIGHT

Analysis	Your result	Summary
Weight loss-regain	● MORE LIKELY TO REGAIN WEIGHT	<i>If you would like to lose some weight, it is not recommended to starve yourself! Rather develop healthy eating habits which you will be able to follow even after you reach your desired weight.</i>
Risk for being overweighted	● LOWER RISK	<i>Your risk is 19% lower than average, which still doesn't mean that you can't put on weight. We advise you to follow detailed report of the analyses.</i>
Response to saturated fats	● NORMAL	<i>The intake of saturated fats is not additionally unfavourable for you. Despite that, your daily intake should not exceed 10% of caloric intake.</i>
Response to monounsaturated fats	● NORMAL	<i>Your daily intake of monounsaturated fats should be 10% of caloric intake. We recommend you to prefer olive oil when preparing the food.</i>
Response to polyunsaturated fats	● NORMAL	<i>Polyunsaturated fats should represent 7% of your daily caloric intake. You will find sufficient amounts of them in hazelnuts, almonds, mackerels, etc.</i>
Response to carbohydrates	● NORMAL	<i>You have a normal response to carbohydrates. We recommend to you a balanced intake of 55% daily.</i>

### BALANCED DIET

Enjoy foods from all food groups, and follow other detailed dietary recommendations.

## THE REQUIREMENT OF NUTRIENTS

Analysis	Your result	Summary
Vitamin B6	● HIGH LEVEL	<i>With your daily food, try to take in 1500 mcg of vitamin B6. Sufficient amounts can be found in turkey liver, tuna, unpolished rice or nuts.</i>
Vitamin B9	● HIGHER LEVEL	<i>Eat enough vegetables, such as cauliflower, artichoke or cabbage, that will help you to consume recommended 400 mcg of vitamin B9 daily.</i>
Vitamin B12	● LOW LEVEL	<i>According to your genetic makeup, your body requires more vitamin B12, namely 6 mcg daily. Chicken and turkey liver contain lot of vitamin B12.</i>

## THE REQUIREMENT OF NUTRIENTS

Analysis	Your result	Summary
Vitamin D	● AVERAGE LEVEL	For consuming 25 mcg of vitamin D daily, we advise you to consume fish (sardines, mackerel) and dairy products.
Iron	● AVERAGE LEVEL	Slightly increase your daily iron intake to 12 mg. We recommend shellfish, lentils and cooked spinach, as they contain sufficient amount of iron.
Sodium (salt)	● AVERAGE SENSITIVITY	Eat food, that is poor in sodium – consume less than 1200 mg of sodium daily. To improve the taste of food, use lemon, garlic or mint.
Potassium	● LOWER LEVEL	We recommend 4000 mg of potassium daily. Fruits (apricots, blueberries), vegetables (leeks, wheat germ), and pistachios are the best sources.
Bone Density	● AVERAGE DENSITY	You can improve your state with regular physical activity and with foods that contain more vitamin C (broccoli, cabbage, black currants).
Zinc	● HIGHER LEVEL	We advise you to consume at least 10 mg of zinc daily. Adequate levels of zinc help you to keep your immune system strong. Red meat, oysters, dark chocolate and legumes are among the best sources of zinc.

## EATING HABITS

Analysis	Your result	Summary
Sweet treats intake	● LOWER TENDENCY	If you, despite favourable genes, will get an urge to have something sweet, instead of unhealthy snacks, pick rice waffles coated with yogurt.
Satiety and hunger	● HIGH TENDENCY	You can lower your appetite with cup of coffee or caffeinated products. Good option is also to include soup in the main course.
Perception of sweet taste	● MORE INTENSIVE	Despite the intensive perception of sweet taste, you should decrease the intake. You can lose your sharp perception with excess sweetening.
Perception of bitter taste	● MORE INTENSIVE	You perceive bitter taste more intensively. You can alleviate unpleasant taste of broccoli, radish and spinach by preparing them as soups and sauces.

## METABOLIC PROPERTIES

Analysis	Your result	Summary
Alcohol metabolism	<span style="color: green;">●</span> EFFECTIVE METABOLISM	Your alcohol metabolism is effective, but we recommend that you would consume it in moderation (up to 1 dl wine or 2 dl beer per day).
Caffeine metabolism	<span style="color: red;">●</span> SLOW METABOLISM	We do not recommend more than one coffee per day, because it increases the risk for problems with blood pressure and cardiovascular diseases.
Lactose intolerance	<span style="color: red;">●</span> INEFFECTIVE METABOLISM	In spite of an ineffective metabolism, you are likely to tolerate small amounts of lactose. Keep track of your response to ingested lactose.
Gluten intolerance	<span style="color: green;">●</span> LOW LIKELIHOOD	Gluten most likely does not impact your metabolism. Your diet should remain as diverse as possible. If experiencing any problems associated with gluten intolerance, try a gluten-free diet.

## DETOXIFICATION OF YOUR BODY

Analysis	Your result	Summary
Oxidative stress	<span style="color: orange;">●</span> HIGHER EXPOSURE	Avoid smoking, as cigarette smoke causes the formation of free radicals, which expose you further to oxidative stress.
Vitamin E	<span style="color: green;">●</span> HIGHER LEVEL	Your daily vitamin E intake should be 14 mg. We advise you to use mainly rapeseed oil, pine nuts and Brazil nuts.
Selenium	<span style="color: green;">●</span> HIGHER LEVEL	Your daily selenium intake should be 40 mcg. Maintain a healthy weight, because with increasing BMI, daily needs for selenium may increase.
Vitamin C	<span style="color: green;">●</span> HIGH LEVEL	Your daily vitamin C intake should be around 100 mg. We advise you to include turnips, cabbage, peas, and potatoes in your diet.

## SPORTS AND RECREATION

Analysis	Your result	Summary
Muscle structure	● GREAT STRENGTH AND EXPLOSIVENESS	<i>Your muscles are explosive, so you're probably better for example during the short-distance disciplines, gymnastics, badminton and squash.</i>
Strength training	● NORMALLY RECOMMENDED	<i>Your genes determine that compared to others, you will gain muscle mass easier without accumulating extra fat. Additional caution in these terms is not necessarily.</i>
Soft tissue injury risk	● HIGHER SOFT TISSUE INJURY RISK	<i>You are more prone to soft tissue injuries, so you should warm up thoroughly before exercise and stop the training gradually.</i>
VO2max	● AVERAGE AEROBIC POTENTIAL	<i>Your aerobic potential is moderate. Perhaps, you need to put some additional effort in achieving the same results as individuals with high aerobic potential.</i>
Post exercise recovery	● FASTER RECOVERY	<i>From genetic point of view you fall within "faster recovery after training." Sleep amount also affects your recovery, therefore have enough rest, especially after high intensive activity.</i>
Heart capacity	● HIGHER HEART CAPACITY POTENTIAL	<i>Your heart capacity is important element of your overall aerobic potential. Since your result is favourable, heart capacity shouldn't be the limiting factor towards achieving high aerobic capacity.</i>
Muscle volume gene	● LOW MUSCLE VOLUME POTENTIAL	<i>Your genetic makeup doesn't give you an advantage in terms of muscle volume gain potential compared to the individuals with one or two A copies of IL15RA present.</i>
Warrior gene	● WARRIOR TYPE	<i>Your result gives you an advantage in stressful situation, as you head remains clear and you probably go for more risk-taking decisions in your life.</i>
Lean body mass	● HIGHER POTENTIAL	<i>For high lean body mass, make sure to consume enough proteins and stay hydrated. Good sources of proteins include eggs, low-fat dairy, lean steak, white-meat poultry and fish.</i>
Gene for fatigue	● SLIGHTLY LESS EFFICIENT LACTATE REMOVAL	<i>Increase intake of B vitamins which help to transport glucose through the body and help to provide the energy for muscles. Foods rich in B vitamins includes fish, beef, leafy green vegetables and eggs.</i>

## ANALYSIS OVERVIEW OF YOUR RESULTS

### LIFESTYLE

Analysis	Your result	Summary
Nicotine addiction	● LOWER RISK FOR ADDICTION	<i>Cigarette smoke is a cause of many health problems, so despite what your genetic results we discourage you from smoking.</i>
Alcohol addiction	● LOWER RISK FOR ADDICTION	<i>Drinking a glass of wine with your dinner is recommended, but drinking too much alcohol, despite your good genes, is not healthy.</i>
Biological ageing	● FASTER AGEING	<i>Your genes determine that you age faster but it depends greatly on your lifestyle.</i>
Inflammation sensitivity	● AVERAGE SENSITIVITY	<i>Strawberries and blueberries contain high amounts of antioxidants, called anthocyanins. Take a handful of berries as a daily snack or include them in smoothies.</i>
Sleep cycle	● MORNING TYPE	<i>Morning-type people reach peak performance 5.4 hours after waking. At this time, you should perform the most difficult mental or physical activities.</i>

### CARDIOVASCULAR HEALTH

Analysis	Your result	Summary
HDL (good cholesterol)	● AVERAGE LEVEL	<i>Your genes determine an average HDL cholesterol level, meaning that your condition can be improved. Try to be physically active every day.</i>
LDL (bad cholesterol)	● AVERAGE LEVEL	<i>Your genes determine an average level of LDL cholesterol. Great measure is to limit intake of trans fats (margarine, mayonnaise, fried foods, etc.).</i>
Triglycerides	● HIGHER LEVEL	<i>Your genes determine 11% higher than average triglyceride level. Garlic is shown to lower triglyceride level, so try to place it into your menu.</i>
Blood sugar	● AVERAGE LEVEL	<i>Limiting intake of foods sweetened with added sugar (coffee, donuts, cookies), can have big influence on lowering blood sugar level.</i>
Omega-3 metabolism	● DECREASED RISK OF DEFICIENCY	<i>Despite favourable genetic result, this still doesn't mean that omega-3 doesn't have to be an important part of your diet. Fish, flaxseeds and canola oil are high in omega-3.</i>

## CARDIOVASCULAR HEALTH

Analysis	Your result	Summary
Omega-3 and triglycerides	● LESS EFFICIENT	<i>If you have increased triglycerides, an omega-3-rich diet may be a less efficient strategy for you. Focus on other strategies, such as regular exercise and limited intake of simple sugars.</i>
Insulin sensitivity	● AVERAGE SENSITIVITY	<i>Include foods rich in fibre - especially those with soluble fibre, such as legumes, oatmeal, flaxseeds, brussels sprouts and oranges.</i>
Adiponectin	● AVERAGE LEVEL	<i>Your genes determine average production of adiponectin. Adiponectin level also depends on body weight, therefore keeping BMI under 25 units should be one of the most important long-term goals.</i>
C-reactive protein CRP	● LOW CRP LEVEL	<i>Your genetic makeup is favourable. To keep it low we recommend you find time to relax each day. It will cause stress hormone drop and consequently reduce inflammation in your body.</i>

## SKIN REJUVENATION

Analysis	Your result	Summary
Skin antioxidant capacity	● SLIGHTLY LESS EFFICIENT	<i>Vitamins C and E, CoQ10, resveratrol, green tea, coffee berry polyphenols have all shown efficiency as antioxidants and free radical scavengers for skin protection.</i>
Glycation protection	● LESS EFFICIENT	<i>Try to limit your intake of food products that are high in white sugar and fructose corn syrup. These are popular ingredients in soda, fruit-flavoured drinks, packaged bread and crackers.</i>
Cellulite	● LOWER RISK	<i>A good measure to keep your risk of developing cellulite low is to simply to drink enough water and eat vegetables with high water content, like cucumbers and tomatoes. This will keep your tissue strong and flexible.</i>
Skin hydration	● DECREASED	<i>Use moisturizers and night creams regularly. They should include ingredients in one of three different classes to help promote skin hydration: humectant, emollients and occlusive.</i>
Skin elasticity	● AVERAGE RISK	<i>Your genes encode balanced collagen production and degradation. However, did you know that external factors like chlorine can also increase the loss of skin elasticity? Try to avoid chlorinated water by using chlorine removal filters.</i>
Stretch marks	● DECREASED RISK	<i>Your genetic make-up protects you from developing stretch marks. General advice to keep the overall risk low would be to avoid restrictive diets and find some time for regular physical activity.</i>

## INSTRUCTIONS FOR READING YOUR PERSONAL DNA ANALYSIS

For a better understanding of your personal DNA analysis, we would like you to read the following instructions.

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### Index and an overview of analyses with your advice

A user-friendly index enables you an easy and fast review of all the analyses. In addition, the index itself already contains the results of the analyses, which show the features (nutrients, lifestyle factors) that you have to pay attention to, based on your genes.

The Index is followed by "An overview of analyses", which features the most important findings and key recommendations for each section separately. A comprehensive summary of recommendations enables you to quickly and easily focus only on the factors that are the most important for you.

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### Sections and analyses

Your personal DNA analysis thematically captures the key elements of your diet and lifestyle. Every section starts with a summary of results, which is followed by an introduction to the subject of the analyses to enable an easy interpretation of results.

An individual analysis contains an explanation of the scientific research and the genes analysed, with the mutations within these genes. Every analysis contains a genetic result and appropriate nutritional and lifestyle recommendations. More detailed explanations for some analyses can be found in the section "More about analyses".

1. SECTION THE INFLUENCE OF DIET ON BODY WEIGHT

2. SECTION THE REQUIREMENT OF NUTRIENTS

3. SECTION EATING HABITS

4. SECTION METABOLIC PROPERTIES

5. SECTION DETOXIFICATION OF YOUR BODY

6. SECTION SPORTS & RECREATION

7. SECTION LIFESTYLE

8. SECTION CARDIOVASCULAR HEALTH

9. SECTION SKIN REJUVENTION

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### Results of your personal DNA analysis

For a better understanding, your results are presented in a colour scheme, where each colour has a specific meaning:



- **Dark green** | Your result is the most optimal; the state simply needs to be maintained.
- **Light green** | Your result is not completely optimal; the state can be improved.
- **Yellow** | Your result is average. If you follow the recommendations, you can do plenty to improve your state.
- **Orange** | Your result is not favourable. For an optimal state, we recommend action.
- **Red** | Your result is the least favourable; pay close attention to these analyses.
- **Grey** | Your result is neutral - it defines neither a positive nor a negative status.

## The analysed genes



A list of analysed genes is added to each analysis, and each gene has a determined genotype. A genotype or the combination of genotypes within an analysis determines your result. More information on the analysed genes can be found at the end of your personal DNA analysis, where it is presented in a chart with a short description of the genes.

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## Recommendations of your personal DNA analysis

Based on your genetic makeup, we have prepared recommendations, which reveal your daily needs in terms of nutrients and guide you into a lifestyle suitable for you. We advise you to act on them, as they consider the needs of your body which are determined by your genes, and which, therefore, have a large influence on your current state and well-being.

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## Nutrition charts

The last pages of your DNA analysis consist of nutrition charts, which will help you to follow our recommendations. Information on the caloric value and the amount of vitamins, minerals and macronutrients is presented for every food item. This enables you to optimally plan your meals because you can comprehensively follow all the nutrients that are present in a specific food item.

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## Legal liability

Your personal DNA analysis is predominantly of educational nature. Its purpose is not to give medical advice for determining diagnoses, treatment, alleviation or prevention of illnesses. Therefore, if you have any serious medical problems, we do not recommend any nutritional changes prior to consulting your personal doctor. Under no condition should you change your medications or any other medical care without the permission of your doctor. For any questions concerning your personal DNA analysis contact us by email: [support.en@geneplanet.com](mailto:support.en@geneplanet.com).

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## Genes and genetic mutations

**Genes** are areas of the DNA chain which carry instructions for the synthesis of proteins. Every gene carries a specific combination of nucleotides marked with the letters A, T, C and G, where an individual combination determines a specific protein. Sometimes a mutation (or an error) occurs in the process of DNA replication, and the nucleotide sequence is not adequate (genetic mutation). This results in the incorrect functioning of the protein.



When doing a personal DNA analysis, we analyse several sites (loci) of your DNA where such mutations can occur. The type of mutation at this locus of DNA is called the genotype. If there is a possibility of substitution at a specific locus of DNA from C to T we have 3 possible genotypes: CC, CT or TT. This happens because we inherit the DNA from our mother, as well as our father, and we therefore have every gene present in two copies. It is, therefore, possible for a mutation to occur only in one copy of the gene, in both copies, or not to occur at all.

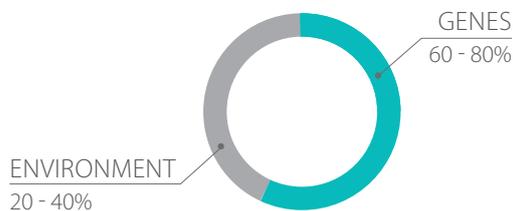
It is clear that various genotypes are one of the most important factors which make people different: we have different eye colour, skin and talents, we are differently susceptible to illnesses, and we have completely unique eating habits.

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## Heritability

In all of the analyses “heritability” is shown, where this information is known. It is a measure that we use to determine how much our genes influence the formation of a certain characteristic. The bigger the heritability is, the greater the influence our genes have, and the lower influence the environment has.

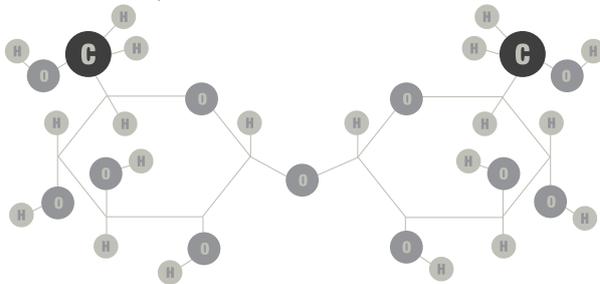
One of the characteristics is the body height of the individual, where genetic factors contribute from 60 to 80 percent, while the environmental impact on the development of body height is between 20 and 40 percent.





## Learn about the main ingredients of diet and the significance of the analysed vitamins and minerals

**Carbohydrates** are macronutrients which represent the most important role in our diet, regardless of the type of diet. According to their chemical structure, we divide them into simple and complex ones. **Simple carbohydrates** are sugars and are naturally present in fruit, milk, and dairy products. They are also found in processed and refined foods such as candy, table sugar, syrups, and soft drinks. Their main property is quick source of energy as they enter your bloodstream very quickly. **Complex carbohydrates** (polysaccharides) have three or more sugars bound together which can be broken down during digestion. Only then can our body use them. They represent a long-term source of energy for the body. The highest amount of complex carbohydrates are found in vegetables, legumes, and cereal products. These food sources, including fruit, also contain an extremely beneficial  **fibre**. As a source of energy, it is useless to our body, as it cannot digest it, but it is important for regulating **digestion, blood sugar, and cholesterol levels**. Remember - the **amount of carbohydrate in the diet is less important than the type** that we consume! For example, whole grains such as whole wheat bread, barley and quinoa are better choices than simple carbohydrates found in white bread, pastries, fizzy drinks and other processed foods.



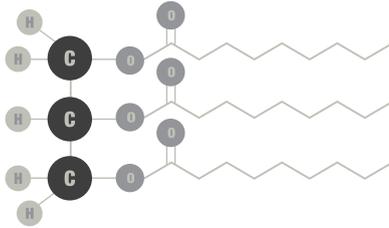
A system called the glycaemic index has been established for evaluating a food item on the basis of its influence on the increase of blood sugar level. This system arranges foods into classes with values from 0 to 100, according to how quickly they increase blood sugar level in comparison to pure glucose. For example, white bread is a food item with a high glycaemic index, and it causes a rapid increase in blood sugar. Unrefined cereals have a low glycaemic index, the body digests them slower, and they cause a steady increase in blood sugar. But there is a downside to the classification of foods according to the glycaemic index because it does not consider the actual amounts of carbohydrates in food. Because of this, a new system has been established, called the glycaemic load, which enables us to classify food items more realistically, according to the criterion of blood sugar increase. This is why, for example, carrots have a high glycaemic index, but a very low glycaemic load. The reason for this is that carrots contain simple sugars, which strongly influence the increase of blood sugar. But, if we consider that the percentage of sugars in carrots is very low, we notice that carrots are actually very beneficial to our body and are highly recommended for diabetics.

**Fats** are macronutrients important for digestion of fat-soluble vitamins A, D, E and K, synthesis of certain hormones, and are the key building blocks of cell membranes. There are different types of fats, with some fats being healthier than others. They are essentially divided into **saturated** and **unsaturated fats**. **Saturated fats** are usually linked with an increased risk of heart disease and high blood cholesterol levels. They are usually solid at room temperature and are found in animal-based products and many processed and packaged foods. **Unsaturated fats** are, opposed to

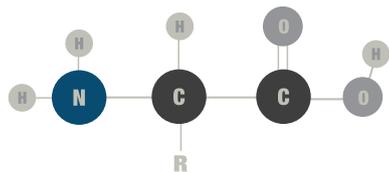


## ABC OF DIET

saturated fats, usually liquid at room temperature. They are found in fish, nuts, seeds, and oils extracted from them. Unsaturated fats are further divided into **mono-** and **polyunsaturated**. Although both groups are extremely important for our body, polyunsaturated fats (like **omega-3 and omega-6 fatty acids**) are the only ones that our body cannot produce. Even though monounsaturated fats are extremely beneficial for us (they reduce LDL and increase HDL cholesterol), they are less resistant to high temperatures. If they are overly reheated, so-called **trans saturated fats** are formed, which are even worse for our body than saturated ones. Eating less saturated and trans fats may help lower your risk of heart disease. When buying products check the labels and choose the varieties that are lower in saturated and trans fats and higher in mono and polyunsaturated fats.



**Proteins** are macronutrients necessary for our body as its main structural component. They are found throughout the body – muscles contain about 30 percent of protein, liver 20 to 30 percent, and red blood cells 30 percent. Proteins are made up of hundreds or thousands of smaller units called **amino acids**, which are attached to one another in long chains. Our bodies make amino acids in two different ways: either from scratch, or by modifying others. There are 20 different types of amino acids that can be combined to make a protein, nine of them, known as the essential amino acids and must come from food. **Animal sources of protein** tend to deliver all the amino acids we need. There are a lot of proteins in meat, poultry and fish, but they can also be found in milk and dairy products. **Other protein sources**, such as fruit, vegetables, legumes, nuts, seeds and cereals, may lack one or more essential amino acids. However, pairing them together (rice and beans, peas or corn, whole grains and peanuts or chickpeas) can also deliver all the amino acids we need. Everyone needs protein in their diet, but if you do endurance sports or weight training you may benefit from increasing your protein intake. What is more, middle-aged and elderly people have more extensive body breakdown than a younger person, which means they need more protein. However, as people enter middle age, hydrochloric acid, which helps digest protein in the stomach, drops to half its regular level. Because protein is crucial in cell regeneration, some researchers suggest that most ageing is due to this drop alone.



**Carbohydrates, fats and proteins**, which are macronutrients, represent a major part of our diet. However, vitamins and minerals, also called micronutrients, are also of great importance in our diet. Very small amounts are needed for our body to function normally. Even though they do not have any energy content, they are very important for our body. They participate in antioxidative processes, cell renewal processes and numerous enzyme reactions. They can be found in various foods, and we recommend you use the nutrition chart for information on a specific vitamin or mineral. We especially recommend eating a good variety of food, which will help you to fulfil your requirements for micronutrients and macronutrients.





# WAY TO YOUR IDEAL BODY WEIGHT

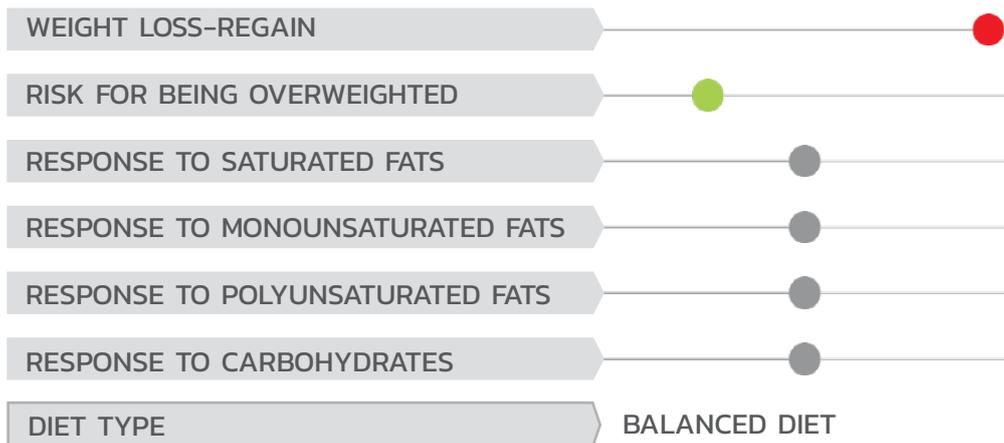
## ADJUST YOUR DIET ACCORDING TO YOUR GENES

Our health is directly related to our diet and eating habits. On the one hand, there is a characteristic excessive calorie intake which results in weight gain, and on the other, there is unhealthy dieting with crash diets which do not have the right effect.

In this chapter, you will learn how your genetic makeup influences the development of excess weight and weight loss-regain and how your body responds to different types of fats and carbohydrates. At the end of the chapter, we reveal "A diet type" that according to your genetic makeup suits you the best.

We recommend that you follow our recommendations because the balance between the intake and the use of calories, physical activity and genetic background is the key to optimal body weight and well-being. It is generally not recommended to eat more calories than are actually burned. In addition to a controlled calorie intake, the right choice of foods is also crucial, as certain foods can cause even more harm, while other foods can improve your condition.

The fact that a diet based on genetic analysis is truly effective has been proven by scientific research performed at Stanford University. The study discovered that people who had been eating according to their genetic makeup had lost 4 kilograms more than those who had been trying to lose weight in no accordance with their genetics.

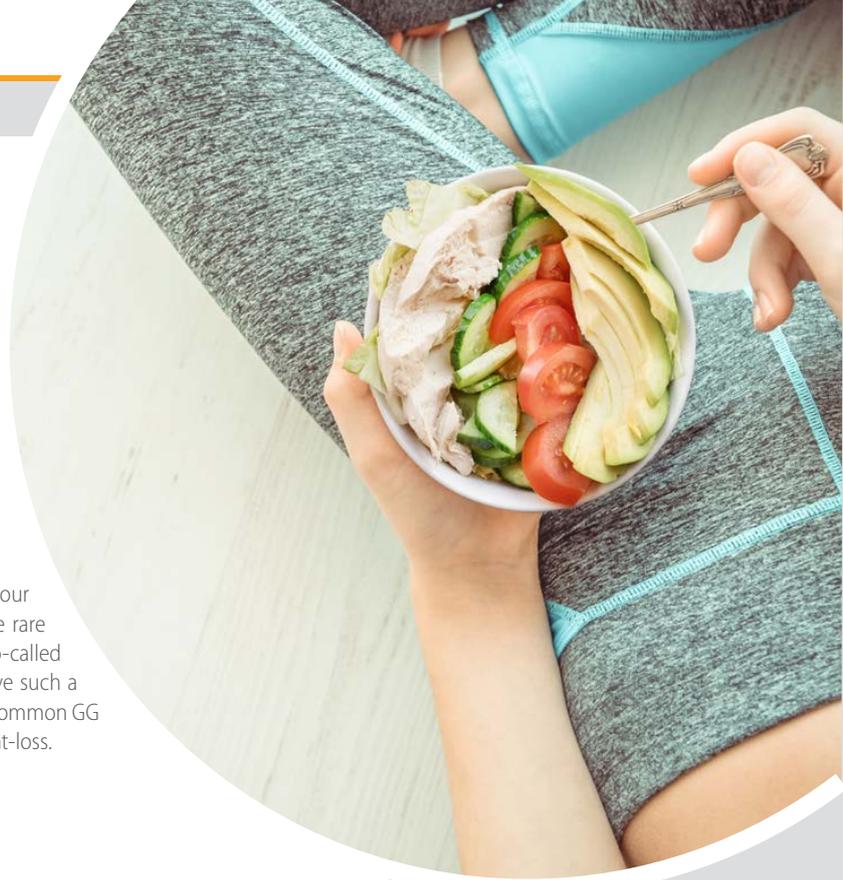


## WEIGHT LOSS-REGAIN

**Weight loss-regain** can be a never-ending cycle. Statistics shows that about 80 percent of people who lose weight regain it after one year. There are mainly two reasons why this happens:

1. people choose restrictive short-term diets, which are hard to follow in the long-term;
2. most people lose their motivation to continue with the diet after achieving their goals. However, there's another reason; namely, tendency to gain weight back has also a genetic background.

The **ADIPOQ gene** has various functions, among which is its influence on our successful weight loss. Studies have shown that people with at least one rare copy of the ADIPOQ gene are more likely to be successful in avoiding the so-called yo-yo effect after weight loss. About 20 percent of people worldwide have such a genetic makeup. Conversely, about 80 percent of the population have the common GG genotype and need to put more effort into maintaining weight after weight-loss.



YOUR RESULT:

### MORE LIKELY TO GAIN WEIGHT BACK

The analysis of you DNA has shown that you are more likely to regain weight after losing it.

#### Recommendations:

- Your genes determine that it's more likely that you will regain your body weight after losing it.
- Bear in mind that this doesn't mean that you can't succeed in maintaining it.
- But don't make the most common mistake: if you decide to lose weight, don't starve yourself!
- It is important that you develop healthy eating habits which you will be able to follow even after you have reached your desired weight.

#### FACT

About 80% of people who lose weight regain it after one year.

#### TAKING IT SLOW

For long-term weight loss you need a long-term plan, like lifestyle change instead of quick-fix diets.

#### HOW TO MAINTAIN WEIGHT LOSS?

Realistic goals, regular exercise, healthy and well-balanced diet.

#### WHY DO WE REGAIN WEIGHT?

Loss of muscle mass during quick-fix diets, sedentary lifestyle, mental health and hormonal problems.

*It is recommended to monitor your body weight once a week. Since weight naturally varies throughout the week, researchers have found that Wednesday weigh-ins are somehow the most accurate.*

# RISK FOR BEING OVERWEIGHT

Nowadays, excess body weight is a prevailing problem, experienced by many. The biggest culprits for this are our genes, which determine the tendency for storing energy. Numerous genes can be responsible for becoming overweight. In our analysis, however, we have included the most reliable genes with the major influence. Undoubtedly, one of the most important genes is MC4R, which is involved in appetite regulation and in maintaining the ratio of ingested and burned calories.

Scientists have discovered a mutation in the DNA sequence close to the above-mentioned gene, which protects against becoming overweight. It has been scientifically proven that people with a favourable variant of the gene have a smaller likelihood of becoming overweight. In addition to this, we have also analysed other genes that importantly influence the possibility of becoming overweight. With a combination of these genes and based on your DNA, we have calculated the risk which shows how much you are prone to becoming overweight, compared to the average population.



YOUR RESULT:

**LOWER RISK**

Compared to the overall population, slightly more favourable variants of genes are present in your DNA, which determines a lower risk of becoming overweight.

## Recommendations:

- Your risk of becoming overweight is lower, which unfortunately does not mean that you cannot gain weight.
- With overeating and no physical activity, you can quickly increase your risk. Therefore, despite the favourable genes, we advise you to follow our recommendations.
- Control the amount of animal fats you consume. Choose leaner meat, because the excess fat can quickly start to accumulate in your subcutaneous tissue.
- After a meal, have some fruit; for example, an apple, a few strawberries or cherries, instead of cakes and other sweets. These foods are just as tasty and, at the same time, extremely healthy.
- Instead of soft drinks or other artificial drinks, which contain a lot of calories, we recommend a glass of water.
- We recommend you to take time for a half-hour walk five times a week, as it will increase your metabolism and calorie consumption.

### FACT

More than 39% of adults are overweight worldwide.

### EVOLUTIONARY ROLE

The capacity of storing energy (fat) to survive periods of food shortage.

### WHAT INCREASES IT?

Eating disorders, unhealthy diet, lack of exercise, stress, genetic predisposition.

### WHAT DECREASES IT?

Healthy lifestyle, diet and exercise, adequate sleep, stress management.

*Did you know that we face an epidemic of obesity? In Europe, one third of the population is overweight!*

## RESPONSE TO SATURATED FATS

**Saturated fats** are found mostly in food of animal origin. Our body uses them as a source of energy, but, unfortunately, in connection to genetic makeup, they also have the property of increasing the risk of becoming overweight. From a 20-year-long study, scientists have discovered a gene that causes some people to gain weight quicker than others due to saturated fats. They discovered that saturated fats have an even more negative effect on people with an unfavourable variant of gene APOA2. In the case of excessive consumption of saturated fats, they have a twice as high risk for becoming overweight, compared to carriers of the common variant of the gene. Despite this fact, people with a risk variant of **gene APOA2** do not need to worry: by reducing their saturated fat intake, they can lower their BMI by 4 kg/m<sup>2</sup>. Such differences have occurred between people with an unfavourable variant of the gene who have consumed normal amounts of saturated fats and those who have appropriately limited their intake.



YOUR RESULT:

### NORMAL RESPONSE

You are a carrier of two favourable copies of the APOA2 gene, and your body responds normally to saturated fats. Approximately 37 percent of people in the population have such an APOA2 gene as you have.

### Recommendations:

- Your genetic makeup determines that saturated fats are not additionally unfavourable to you.
- Your daily intake of saturated fats can be slightly higher than for people with an unfavourable variant of the gene; therefore, you will follow your daily intake recommendations more easily.
- We recommend that you closely follow your diet recommendations at the end of the chapter, which take into account your response to saturated fats.
- When planning your menu, we suggest you use the nutrition charts, to make following our recommendations easier.

*Saturated fats affect the transport of calcium, therefore it is not surprising that they are present in maternal milk. They are extremely important for our body, but the problem is their large representation in products of animal origin that can quickly lead to an excess of them.*

#### WHY DO WE NEED THEM?

Source of energy for the body.

#### CAN WE PRODUCE THEM?

Yes.

#### HEALTH IMPACT

Increased LDL and slightly increased HDL levels, increased risk of cardiovascular diseases.

#### SOURCES

Processed meat products (salami, hot dogs, pâtés), lard, butter, milk and dairy products.

# RESPONSE TO MONOUNSATURATED FATS

**Monounsaturated fats**, just like saturated fats, are non-essential – they are not necessary for survival because our body knows how to produce them. However, they are very beneficial for our body, because they visibly influence the increase of good HDL cholesterol, and simultaneously reduce the level of triglycerides and LDL, or weaken cholesterol. In addition, it has been proven that they reduce the risk of becoming overweight. Their increased consumption can, therefore, be very beneficial, especially if we are the carriers of a certain variant of a gene. It has been discovered that people with a favourable variant of the **ADIPOQ gene** can efficiently reduce their body weight with a sufficient intake of these fats. Sufficient intake of monounsaturated fats has enabled carriers of a favourable variant of the ADIPOQ gene an approximately 1.5kg/m<sup>2</sup> lower BMI. Therefore, if you are the carrier of a favourable variant of the ADIPOQ gene, a slightly higher intake of monounsaturated fats, which will favourably influence your body weight, is recommended.



YOUR RESULT:

## NORMAL RESPONSE

The analysis has shown that you are a carrier of a genetic makeup which determines a normal benefit of monounsaturated fats for your body.

### Recommendations:

- Although you respond normally to monounsaturated fats, this does not mean that they are not important for your health.
- Monounsaturated fats, together with polyunsaturated fats, reduce the levels of LDL cholesterol and triglycerides and increase the level of HDL cholesterol. This is why foods with a higher amount of unsaturated fats are known as generally healthy.
- A great source of monounsaturated fats are olives, avocado, hazelnuts, macadamia nuts and cashews, which can be added to many dishes or used for making delicious spreads.
- You can find detailed advice concerning the recommended daily intake of monounsaturated fats in your diet plan, so we recommend that you follow it.

#### WHY DO WE NEED THEM?

Source of energy, growth, development, functioning of the cardiovascular and nervous system.

#### CAN WE PRODUCE THEM?

Yes.

#### HEALTH IMPACT

Reduced LDL and triglycerides and increased HDL levels.

#### SOURCES

Oils, nuts and seeds (olive, rapeseed, macadamia, almonds, cashews).

*Among monounsaturated fats, oleic acid (largely present in olive oil) is particularly beneficial for our health. Olive oil contains also many antioxidants and its use can even protect you against cardiovascular disease.*

## RESPONSE TO POLYUNSATURATED FATS

Unlike saturated and monounsaturated fats, **polyunsaturated fats** are essential for our body – our body desperately needs to get them from food, as it cannot produce them. They are vital for a healthy heart and brain function, as well as our growth and development. The most important are the groups of omega-3 and omega-6 fatty acids, whose ratio in our diet should be 1:5; but in a modern-day person, the ratio of omega-6 fatty acids is increasing, which is not very healthy. Even though polyunsaturated fats are very beneficial for our body, they have an even more positive effect for some people.

In the research study on which our analysis is based, it was discovered that a certain variant of the **PPAR-alpha gene** can determine the relationship between polyunsaturated fats and triglycerides in the blood. It has been proven that people with a risk variant of the gene, and with an inappropriate intake of polyunsaturated fats, have a 20 percent higher triglyceride level compared to other people. And this can have an unfavourable effect on your health. High intake of polyunsaturated fats has completely levelled out these differences, and it is therefore so much more important for people with a risk variant of the gene to adjust their diet and increase the intake of polyunsaturated fats.



### YOUR RESULT:

## NORMAL RESPONSE

You are the carrier of two common copies of the PPAR-alpha gene, which causes you to respond perfectly normally to polyunsaturated fats.

### Recommendations:

- Your genetic makeup determines that you respond perfectly normally to polyunsaturated fats. Nevertheless, do not forget about them because they are very beneficial for your health (they help burn body fat).
- The most important are predominantly omega-3 fatty acids, which are many times overshadowed by omega-6 fatty acids. We advise that their ratio should not be higher than 1:5.
- They can be found in many nuts, seeds and fish; for example, in flax seed and salmon.
- We recommend you use the nutrition charts, which will enable you to optimally follow our recommendations.

*Did you know that despite the fat abundance of a typical diet, we are mostly suffering a fat deficiency? We are lacking polyunsaturated fats that are essential for the adequate functioning of our cells. A simple way to improve this deficiency is to consume flaxseed oil, which has a high content of polyunsaturated fats.*

### WHY DO WE NEED THEM?

Source of energy, growth, development, functioning of the cardiovascular and nervous system.

### CAN WE PRODUCE THEM?

No.

### HEALTH IMPACT

Reduced LDL and triglycerides and increased HDL levels, decreased risk of cardiovascular disease.

### SOURCES

Fish, seafood, oils, nuts and seeds (walnut, sunflower, flaxseeds, soybeans).

# RESPONSE TO CARBOHYDRATES

**Carbohydrates** are the most basic source of energy needed for physical activity of our body. Because of their taste, we sometimes call them sugars. Various diets have a very different attitude towards them: some diets are based on carbohydrates, while other recommend limiting them. Yet others recommend that we consume them separate from proteins and fats. Of course, such diets are not successful with all people, because they do not consider your genetic makeup. We, however, have done precisely that.

We have analysed the **FTO** and **KCTD10 genes**, which determine the influence carbohydrates have on your body. It has been discovered that if they do not consume enough carbohydrates, people with a risk variant of the FTO gene are 3-times more susceptible to becoming overweight, compared to people who are carriers of two common variants of the FTO gene. With an adjusted intake of carbohydrates, they can considerably eliminate this risk. On the other hand, the KCTD10 gene determines the relationship between the intake of carbohydrates and the HDL cholesterol level and with an inappropriate intake and a risk variant of the mentioned gene, the HDL cholesterol level can rapidly decrease.



## YOUR RESULT:

### **NORMAL RESPONSE**

You are the carrier of the variants of the **FTO** and **KCTD10 genes**, which determine a normal response to carbohydrates.

## Recommendations:

- We recommend that your diet contains a balanced amount of carbohydrates.
- What exactly this means for you is revealed in the "Diet type" analysis, where we have determined, on the basis of your genes, a precise daily intake of carbohydrates suitable for you.
- The fact is that your genes do not determine an increased intake of carbohydrates as being beneficial for you, nor in any way harmful to you to the extent that you would have to reduce their intake – an average, balanced intake of carbohydrates is, therefore, the healthiest for you.
- For following your diet plan, we suggest using the nutrition charts, which will make our recommendations even easier to follow.

### **WHY DO WE NEED THEM?**

Sugar and starch are a source of energy, fibre provides satiety and enhances digestion.

### **CAN WE PRODUCE THEM?**

Yes, but we still need to consume some of them (fibre).

### **HEALTH IMPACT**

Increased body weight, waist circumference, blood sugar, blood pressure.

### **SOURCES**

Cereals (wheat, maize, rice), potatoes, vegetables, fruit.

*Apples, oranges and apricots after a meal can be a reason for discomfort. They contain the substance pectin that binds water and swells. With some people it can lead to feeling bloated or belching.*

# DIET TYPE

It is much easier to say what is unhealthy in general for all of us than to answer the question about what type of diet is most suitable for an individual. The reason for this is the genetic makeup, which determines the suitability of a specific diet plan for our body. This is precisely why one diet can be very successful for one person but does not work for someone else, or can even have a negative effect.

The diet that we recommend is not merely coincidental, but it is based on your genetic makeup. The diet based on your personal DNA analysis considers your individual characteristics and allows you to eat what your body truly needs.

## YOUR RESULT: BALANCED DIET

**Your genes determine that the most appropriate diet for you is a balanced diet. It will provide you with enough energy as well as all required nutrients which contribute to optimal health. We recommend you choose a good variety of food from different food groups. Also follow the detailed recommendations for your diet, which will help you to satisfy your nutritional needs.**

Your daily calorific intake, which is in accordance with your genetic profile, is presented in the chart below. Genes, namely, regulate the amount of energy that your body uses in resting, and this is why we were able to adapt our recommendations according to your genetic makeup. Do not forget to consider your daily physical activities, as calorie consumption increases with physical activity, and it decreases on your less active days.

### An optimal daily calorie intake:

Age	Exclusively sitting Activity with little activity in free time	An occasionally higher use of energy for walking and standing activities	Regular moderate physical activity	Intensive physical activity
	kcal/day	kcal/day	kcal/day	kcal/day
14 to 19	2509	3088	3667	4053
20 to 25	2460	3028	3596	3975
26 to 51	2316	2850	3384	3741
52 to 65	2140	2634	3128	3457
over 66	2039	2510	2980	3294

With the help of **genetic analysis**, we have also determined the percentage of daily calorie intake represented by saturated, monounsaturated and polyunsaturated fats, carbohydrates and proteins. The calories can be easily transformed into grams by using the following method:

- 1 gram of protein or carbohydrates is 4 kcal
- 1 gram of fat is 9 kcal

**Example:** 10 percent of monounsaturated fats in a daily intake of 2000 kcal is 200 kcal, which is approximately 22 grams (200/9) of monounsaturated fats.

### Your recommended daily percentages of basic nutrients:

Nutrient	Your response	Daily intake (%)
Saturated fatty acids	<b>NORMAL</b>	<b>10</b>
Polyunsaturated fatty acids	<b>NORMAL</b>	<b>7</b>
Monounsaturated fatty acids	<b>NORMAL</b>	<b>10</b>
Carbohydrates	<b>NORMAL</b>	<b>50-55</b>
Proteins		<b>18-23</b>

### Recommendations:

#### MEAT AND FISH

You shouldn't opt for meat more than 4 times a week. Instead of beef and pork, try to opt for turkey meat more often, as it is healthier.

Choose lean cuts of meat and meat products which are prepared from whole chunks.

If you are vegetarian, you will successfully replace animal proteins with soy foods such as tofu or soy burgers.

Fish should be on your menu at least once a week. We recommend sea bass, sardines, mackerel or tuna.

#### MILK AND DAIRY PRODUCTS

Drink a glass of milk or eat yoghurt without added sugar. Yoghurt contains probiotic bacteria which regulate our digestion. Have a whole wheat bun with your yoghurt or add it to your favourite cereal.

Spread a spoonful of cottage cheese on a slice of bread or eat it with two slices of low-fat cheese.

Every now and then, prepare yourself milk rice or similar milk dishes (milk millet porridge, milk semolina).

#### OILS, NUTS AND SEEDS

When preparing food, do not overdo the oil. Add only as much as is absolutely necessary. We recommend pumpkin oil, virgin olive oil or sunflower oil.

For example, eat a large spoonful of ground flaxseeds and a spoonful of pumpkin seeds every day. You can sprinkle them over salads and pasta, or mix them with yoghurt or cottage cheese.

From nuts and seeds we especially recommend sesame seeds and Brazil nuts, which will enrich your dishes.

#### LEGUMES, VEGETABLES AND STARCHY FOODS

Your diet should consist mainly of complex carbohydrates. We recommend that you eat enough legumes and other vegetables. If possible, have them in every main course.

The most appropriate for you are peas, broad beans, chickpeas, barley, leek, kohlrabi, cauliflower, mangold, lamb's lettuce, lentils and dandelion leaves.

Prepare them as salads or side dishes, but they can also represent your main course.

We also recommend porridge dishes made of spelt or barley. Mix one ladle of such porridge with mushrooms or cooked vegetables.

Other sources of carbohydrates should include unmilled rice, whole wheat or black bread, bran, kale, fennel, leek and mangold.

#### FRUITS

Throughout the day, eat at least two of the following fruit items: a handful of raspberries, blueberries or blackcurrants, strawberries, a pear or an apple. If fresh fruits are not available, an equally healthy option is dried fruits.

#### GENERAL RECOMMENDATIONS

Eat foods that contain a lot of carbohydrates in the first half of the day, but, towards the evening, limit yourself to vegetables.

Opt for fresh, seasonal and unprocessed foods. Pre-prepared food contains a lot of unhealthy additives which allow it to have longer expiration date.

Avoid frying. Stewing in own juices or boiling is definitely more recommendable.

Also, avoid additionally salting your food and sweetening your drinks, because you will only mask their true flavour.



**PERSONALIZED  
NUTRIPLAN**

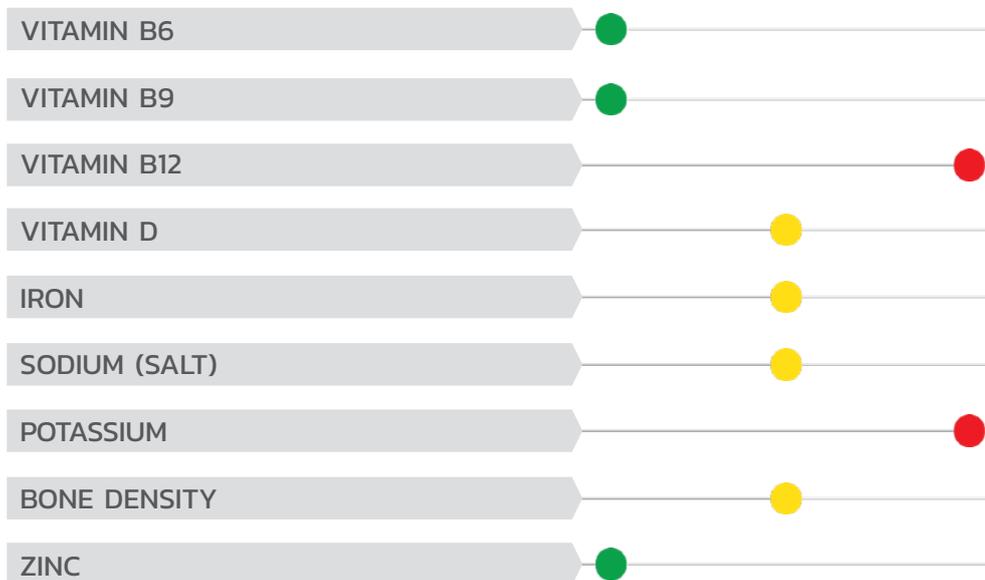


# WHICH VITAMINS AND MINERALS DOES YOUR BODY NEED?

## MICRONUTRIENTS PLAY AN IMPORTANT PART IN YOUR HEALTH

Micronutrients, which include vitamins and minerals, are vital for our health. They are essential for the functioning of our body; they improve our well-being and prevent many diseases. Their daily requirements are determined by numerous factors, and among them is our genetic makeup. It determines which vitamins and minerals we have to consume in an increased amount or vice versa. We can get almost all of the vitamins and minerals we need from regular food. However, this can be slightly more difficult if we are prone to the lack of them. In such cases, food supplements are a good option.

In this chapter, we will reveal to you what levels of vitamin B complex, vitamin D and E and also minerals, such as iron, zinc and potassium, are determined by your genes. In addition, you will also learn how sensitive you are to kitchen salt or sodium. The latter can be specifically adjusted with an appropriate intake of vitamins and minerals.



# VITAMIN B6

**Vitamin B6**, also known as pyridoxine, has numerous functions which are extremely important for our health. More than 100 enzymes, involved in the metabolism of fats, need it for their function, and it is crucial for red blood cell metabolism and for the functioning of the nervous and immune system. All of this confirms its key role in achieving optimal health. Some people are genetically prone to having a lower level of vitamin B6 in their body, which also, among other things, depends on the variant of the **ALPL gene**. In the study on which this analysis is based, people with an unfavourable copy of the ALPL gene had an approximately 20 percent lower level of vitamin B6. People with two unfavourable copies of the gene ALPL gene had, in comparison to people with two copies of favourable genes, up to a 40 percent lower level of vitamin B6. The reason for such differences is a less effective absorption of vitamin B6 in people with an unfavourable variant of the ALPL gene. As a result, they have a higher requirement for vitamin B6.



YOUR RESULT:

**HIGH LEVEL**

Results show that you are the carrier of two favourable copies of the ALPL gene, which determines a 20 percent higher level of vitamin B6. Approximately 25 percent of people have such a genetic makeup.

## Recommendations:

- Your vitamin B6 requirements are, therefore, lower but we still recommend that you consume 1500 mcg of vitamin B6 per day.
- Plenty of it can be found in turkey liver, tuna (also canned), unmilled rice and hazelnuts.
- It can be found in all food groups (with the exception of oils) and with a diverse diet, you will not have any problems with the lack of vitamin B6.
- According to your result, you do not need to take food supplements.

### WHY DO WE NEED IT?

Functioning of the nervous and immune system, red blood cells formation.

### CAN WE PRODUCE IT?

No.

### SYMPTOMS OF DEFICIENCY

Weakened immune system, psychological disorders, anaemia.

### SOURCES

Baker's yeast, liver, legumes, seafood, whole grains.

*Vitamin B6 is also called pyridoxine, but not always has it been called this way. In 1936, when it was discovered, its name was a synonym for "anti-dermatitis factor"; since scientists discovered that it can cure the skin disease dermatitis. Vitamin B6 is still used today for different types of skin infections.*

## VITAMIN B9

**Vitamin B9**, also known as folate, or folic acid, is a water-soluble vitamin, which is crucial for an adequate metabolism (an essential component of enzymes), healthy blood, DNA synthesis, and it is also an important factor which reduces the risk of cardiovascular disease.

One of the best-known and most important enzymes, which ensure an appropriate B9 vitamin level, is **MTHFR**. A mutation can occur within the gene that determines this enzyme. This can greatly influence the vitamin B9 level, which has been confirmed by many studies. MTHFR enzyme is sensitive to temperature and thus less active in people who are carriers of an unfavourable variant of the gene, resulting in lower vitamin B9 level. It has been discovered that every unfavourable copy of the MTHFR gene markedly reduces the vitamin B9 level. If you are the carrier of one of the unfavourable copies of the gene, it is highly recommended that you adjust your diet to achieve optimal health.



YOUR RESULT:

**HIGHER LEVEL**

You are the carrier of two favourable copies of the MTHFR gene, which determine a higher vitamin B9 level. Approximately 49 percent of people have such a genetic makeup.

### Recommendations:

- Because of favourable genes you are able to fulfil your daily vitamin B9 requirements with 400 mcg of vitamin B9 per day.
- Include in your menu vegetables such as green lettuce, cauliflower, artichokes or cabbage, as they contain sufficient amounts of vitamin B9, which will enable you to have an appropriate vitamin B9 level.
- High amounts of vitamin B9 are found in whole wheat pasta and rice.
- Because you are the carrier of the most favourable genetic makeup, you can, undoubtedly, consume enough vitamin B9 with food only, and do not need any food supplements.

#### WHY DO WE NEED IT?

DNA, RNA and amino acid synthesis, red blood cell maturation.

#### CAN WE PRODUCE IT?

No.

#### HEALTH IMPACT

Anaemia, insomnia, irritability.

#### SOURCES

Green leafy vegetables, sprouts, liver, baker's yeast.

*Vitamin B9 is called also folic acid. The name is a derivative of the Latin word folium, meaning leaf. No wonder, since Vitamin B9 is mostly found in leafy vegetables. The consumption of leafy vegetables is highly advisable because our body cannot produce folic acid.*

## VITAMIN B12

**Vitamin B12**, also known as cobalamin, has a central role in the functioning of the entire nervous system, which is important for cognitive abilities in particular. Vitamin B12 is involved in the synthesis of DNA and red blood cells, as well as the synthesis of fatty acids. A healthy diet gives the body sufficient amounts of vitamin B12. The lack of it, however, is common in vegetarians, vegans, older people and people who are genetically prone to the lack of vitamin B12.

Numerous studies have confirmed the influence of **FUT2 gene** and its genetic variant on vitamin B12 level. The research that we rely on has proven that every unfavourable copy of the FUT2 gene reduces the level of vitamin B12 level by 10 percent. As a consequence, people with the least favourable genetic makeup have a 20 percent lower vitamin B12 level.



YOUR RESULT:

**LOW LEVEL**

You are the carrier of two unfavourable copies of the FUT2 gene, which determines a 20 percent lower vitamin B12 level, compared to people with two favourable copies of the FUT2 gene. Approximately 18 percent of people have such a genetic makeup.

### Recommendations:

- Your daily vitamin B12 requirements are higher and we, therefore, recommend that you daily consume 6 mcg.
- You will get the most vitamin B12 with rabbit meat, chicken and turkey liver, brook trout, Trappist cheese or Edam cheese and eggs.
- It can be found in enriched breakfast cereals, especially those for vegetarians. These products have very different content levels of vitamin B12, so it is advisable to carefully read food labels before purchase.
- Vitamin B12 is present in some food supplements that contain yeast, and they can be very beneficial for you.

#### WHY DO WE NEED IT?

Red blood cell maturation, functioning of the nervous system, DNA synthesis.

#### CAN WE PRODUCE IT?

No.

#### SYMPTOMS OF DEFICIENCY

Anaemia, psychological disorders, bad eyesight.

#### SOURCES

Beef and pork meat, liver, seafood, eggs, milk and dairy products.

*Did you know that the elderly have lower levels of vitamin B12? And this is supposed to be one of the reasons why our memory fades with age. It is also very likely that vitamin B12 deficiency plays an important role in the development of Alzheimer's disease, therefore intensive research is on-going in this field.*

# VITAMIN D

**Vitamin D** is an important vitamin which enables the absorption of calcium from the intestines into the blood – vitamin D, allows the calcium to be incorporated into our bones, and is, therefore, an important factor which enables healthy bones. The level of vitamin D depends on our diet and exposure to sun, as well as on our genetic makeup.

In a study, started in 2010, vitamin D levels were measured for 33,000 people and several genes were analysed for their influence on vitamin D uptake. Three genes, that varied slightly between people and influence vitamin D levels, were identified. The mutation in the **GC gene** had the greatest influence, and people with two unfavourable copies of the gene had a 20 percent lower vitamin D level. The **DHCR7** and **CYP2R1 genes** were also analysed in addition to GC, and they had an equally important influence on the vitamin D level. The three genes mentioned have been included in our analysis and, based on this analysis, we can effectively predict the level of vitamin D determined by your genes.



YOUR RESULT:

**AVERAGE LEVEL**

The analysis has shown that you are the carrier of a genetic makeup which determines an average vitamin D level.

## Recommendations:

- Compared to people with the most favourable genes, you have slightly higher vitamin D requirements, and we recommend that you consume 25 mcg of vitamin D daily.
- There is plenty of it in fish (sardines and mackerel), and dairy products (crème fraîche, Edam cheese, and mozzarella).
- Apart from diet, exposure to sunlight also significantly influences the vitamin D level. However, you should not overdo it with sunbathing, as 10 to 15 minutes a day will be completely sufficient.
- Lack of vitamin D can express mostly in vegetarians or vegans and, in this case, we recommend food supplements.

*Did you know that magnesium is one of the important factors that influence activity of vitamin D? Sufficient levels of magnesium in the blood are essential to convert vitamin D into its active form. Magnesium also plays an important role in the influence of vitamin D on the immune system.*

### WHY DO WE NEED IT?

Calcium and phosphorus absorption, bone health.

### CAN WE PRODUCE IT?

Yes, it can be produced in our skin when exposed to UVB sunlight.

### SYMPTOMS OF DEFICIENCY

Fatigue, muscle pain, brittle bones, osteoporosis.

### SOURCES

Fish and fish oil, seafood, egg yolk, liver, sunlight.



# IRON

**Iron** is a mineral which is needed for healthy blood and an adequate functioning of numerous enzymes. Although the problem is mainly its lack, some people actually have an excess of iron. In order to avoid the two extremes, the iron level in our body is carefully regulated.

One of the genes that are in charge of the appropriate iron level in our body is the HFE gene. In some people it is dysfunctional, and this results in an iron level that is too high. According to scientific articles, 80 percent of people that have a too high iron level have an unfavourable variant of the **HFE gene** present on both of their chromosomes. However, among these, only 28 percent of men and 1 percent of women actually developed signs of excess iron accumulation in the body. This information proves that apart from the high importance of genes, our diet also plays a vital role since it determines 70 percent of the final iron level.



YOUR RESULT:

**AVERAGE LEVEL**

You are the carrier of such variants of the HFE and TMPRSS6 genes that determine an average iron level. Approximately 30 percent of people in the population have such a genetic makeup.

## Recommendations:

- We recommend that you consume 12 mg of iron with food daily.
- We advise mostly turkey and pork liver, mussels, brown rice and cereal sprouts, which contain enough iron.
- Iron is present in almost all of the food groups, and you can fulfil your daily iron requirements with mixed foods.
- Symptoms such as paleness, fatigue and nausea are the result of a longer lack of iron in your blood. In this case, opt for food supplements, which will replace the deficit.

*Although most people believe that their iron levels improve most effectively with the consumption of beef, dark chocolate actually contains three times more iron. In addition to dark chocolate, more iron is present even in some grains and nuts than in meat. This fact is especially crucial for vegetarians.*

### WHY DO WE NEED IT?

Blood oxygen transport, red blood cells and haemoglobin formation.

### CAN WE PRODUCE IT?

No.

### SYMPTOMS OF DEFICIENCY

Anaemia, tiredness and fatigue, weakened immune system.

### SOURCES

Beef meat, liver, mussels, nut and seeds, legumes, whole grains.



## SODIUM (SALT)

**Sodium** is the main ingredient of kitchen salt, and it is also present in many other foods – predominantly those of animal origin. It is responsible for a normal functioning of the nervous system and the muscles, as well as for maintaining the osmotic pressure and the regulation of the amount of water in the body. Our body does not usually have problems with the lack of sodium, and food with less sodium is therefore considered the healthiest. It has been proven in many studies that an excessive intake of sodium (salt) is an important health risk factor. Sodium actually increases blood pressure, and this leads to other medical conditions. In studies where they attempted to gradually decrease salt intake, the systolic blood pressure (the pressure when the heart pushes the blood through the arteries) in adult population dropped by 5 percent on average, which reduced the occurrence of stroke and cardiovascular disease by 24 percent and 18 percent respectively. It is, therefore, recommended to limit salt intake. This is much more important for people whose blood pressure is even more sensitive to sodium or kitchen salt due to their genetic makeup.



YOUR RESULT:

### AVERAGE SENSITIVITY

Your sensitivity to sodium is average; however, you are more sensitive compared to people with the most favourable genetic makeup.

### Recommendations:

- We recommend low sodium foods, which means that you should try to limit your daily sodium intake to no more than 1200 mg.
- Pay attention to food labels: choose foods that do not have added salt.
- Instead of improving the taste of food with salt, use different herbs and spices. We recommend lemon, bay leaf, nutmeg, coriander, dill, garlic or mint.
- It is also important that you drink 2 litres of fluid daily. This way the excess salt will pass out of your body.

#### WHY DO WE NEED IT?

Blood pressure regulation, muscle and nervous system function.

#### CAN WE PRODUCE IT?

No.

#### SYMPTOMS OF OVERCONSUMPTION

High blood pressure, increased risk of stroke and other cardiovascular diseases.

#### SOURCES

Table salt, cheese, sausages, pickled foods, processed foods.

*Did you know that one pizza contains as much as 4800 mg of sodium? This means that just by eating a whole pizza we consume more the 2 times the recommended daily amount of sodium!*

# POTASSIUM

Right after calcium and phosphorus, **potassium** is the most widespread mineral in our body. It is important for maintaining a regular heartbeat, muscle contraction, and water regulation in the body. Although, in principle, it is not difficult to enrich our diet with potassium, its lack in people is very common. This is unfavourable because the lack of potassium increases blood pressure.

In a scientific research study on which our analysis is based, it was shown that a variant of the **WNK1 gene** influences the potassium level in our body. WNK1 is a gene which regulates the transport of potassium, and its link to the potassium level is, therefore, not surprising. The above-mentioned research has shown that each unfavourable variant of the WNK1 gene is linked to an approximately 5 percent lower potassium level. People with the least favourable genetic makeup tend to have, therefore, a 10 percent lower potassium level.



YOUR RESULT:

**LOWER LEVEL**

The analysis has shown that you are the carrier of two unfavourable copies of the WNK1 gene, which determines a lower potassium level. Approximately 43 percent of people have such a genetic makeup.

## Recommendations:

- We recommend that you consume 4000 mg of potassium daily, as your requirements are slightly greater.
- The highest amounts of potassium can be found in apricots, blueberries, leek, pistachios, cereal sprouts, pumpkin seeds and brook trout, and you should often opt for these foods.
- In order for you to carefully follow our recommendations, we recommend use of the nutrition charts.
- We also recommend that you drink alcohol moderately. Too much alcohol brings many negative consequences for your health, and it additionally influences the decrease of potassium level.

### WHY DO WE NEED IT?

Heart rhythm regulation, muscle contraction, nervous impulse transfer.

### CAN WE PRODUCE IT?

No.

### SYMPTOMS OF DEFICIENCY

Heart rhythm disorders (arrhythmias), muscle weakness, fatigue.

### SOURCES

Green leafy vegetables, bananas, avocado, tomatoes, nuts and seeds.

*Potassium is the first element obtained by the use of electrolysis of molten salt. Its name derives from an Arabic word, which means plant ash. Plant ash includes potassium carbonate, which is also used in the production of soap.*

# BONE DENSITY

By measuring **bone density**, we define the vitality of our bones. A decreased bone density is most typical for older people, but younger people can also encounter problems. We know two groups of factors which influence bone health. We have no influence on factors such as age, health condition, medications, health therapies and genetic design, but we can contribute to the health of our bones with regular physical activity and an appropriate diet. An appropriate diet and lifestyle are important in early years because they contribute to maintaining bone density later, at an older age.

To date, many genes that determine bone strength have been discovered, and an understanding of the mechanisms with which these genes influence bone structure is improving. You can read more about the genes included in the analysis in the section "Analysed genes".



YOUR RESULT:

## AVERAGE BONE DENSITY

The analysis of the genes responsible for bone strength has shown that you have favourable as well as unfavourable genes present, which determines an average bone density.

### Recommendations:

- In addition to your genetic makeup, regular physical activity and an appropriate diet influence bone density, and we advise you to follow our recommendations.
- Calcium is most crucial for healthy bones, and we, therefore, recommend that you consume 1100 mg of calcium daily.
- Enough calcium can be found in chicken and turkey liver, dried figs, dandelion and sesame seeds. The latter contain almost 6 times more calcium than can be found in milk.
- Mineral water can also be a source of calcium. If you do not like milk, bear in mind that 1 litre of mineral water contains as much calcium as two glasses of milk.
- We recommend that you eat broccoli, cabbage and blackcurrants. Such foods contain a lot of vitamin C, which is important for collagen synthesis (organic part of bones).

*The most important method for measuring bone density is bone densitometry, which is performed on the basis of X-rays. Measurements are performed on the lumbar spine and on one of the hips, and on people under 50 years of age, on the wrist too. The examination is safe and simple, and is conducted in only a few minutes.*

#### WHY DO WE NEED IT?

Bones provide a frame for skeletal muscles and protect internal organs.

#### SYMPTOMS OF LOW BONE DENSITY

Brittle bones, osteopenia, osteoporosis.

#### WHAT DECREASES IT?

Smoking, alcohol consumption, excess weight, unhealthy diet, lack of exercise.

#### WHAT INCREASES IT?

Exercise, healthy lifestyle and diet high in calcium, magnesium, vitamin D and K.

# ZINC

**Zinc** is an essential trace element and it is the second most common mineral in the body (after iron). It is vital for the functionality of **more than 300 enzymes**, for DNA stabilisation and gene expression. One of the main health benefits of zinc is enhanced immune function. As such, it is used for example in the treatment of the common cold as it can help relieve symptoms by reducing inflammation in the nasal cavity. Beyond this, zinc plays an important role in protein synthesis, body growth, blood clotting, insulin function, reproduction, vision, taste and smell. Zinc also aids in wound healing as it helps to stick skin and mucous membranes together.

Low levels of zinc may increase susceptibility to infections. Zinc deficiency is more common among older people as well as in vegetarians since red meat and other animal products are rich in zinc. Zinc is also present in some plants. However, the absorption of zinc from plant sources is less effective.

In the scientific research on which our analysis is based it has been shown that genetics can influence a person's zinc blood levels. CA1, PPCDC and NBDY genes have all been shown to be significantly associated with a person's blood levels of zinc.



YOUR RESULT:

**HIGHER LEVEL**

Your genetic profile indicates that you are more likely to have high zinc levels in your blood.

## Recommendations:

- Adequate levels of zinc help you to keep your immune system strong and can help to protect you from infections.
- We recommend you consume not less than 10 mg of zinc on a daily basis.
- You need to pay attention if you are suffering from gastrointestinal problems, which can reduce zinc absorption.
- The need for zinc is also increased in vegetarians whose diet contains more phytates, which limits the bioavailability of zinc, so the need for zinc intake can be increased by as much as 50 percent.
- Meat, poultry and seafood are among the best sources of zinc. Vegetables rich in zinc are kidney beans, green peas, chickpeas, cashews, shiitake mushrooms and lentil sprouts.
- Bioavailability of zinc is lower in plant foods than animal foods because of the phytates present in the seeds of cereals and legumes. Soaking beans and legumes for upwards of 48 hours before use may increase zinc absorption.

### WHY DO WE NEED IT?

DNA and protein synthesis, functioning of immune system, fertility and reproduction.

### CAN WE PRODUCE IT?

No.

### SYMPTOMS OF DEFICIENCY

Loss of appetite, dermatitis, weakened immune system.

### SOURCES

Oysters, beef meat, whole grains, legumes, nuts and seeds.

## THE REQUIREMENT OF NUTRIENTS





# IMPORTANT INFLUENCES ON YOUR EATING HABITS

## UNHEALTHY EATING HABITS CAN ALSO BE INHERITED

Our health is directly related to our eating habits. Skipping meals, especially breakfast, eating too much candy, eating oversized meals and excessive sweetening of foods are common phenomena in today's society. On the one hand, there is a characteristic excessive calorie intake which results in weight gain, and on the other, there is unhealthy dieting with crash diets which do not have the right effect.

Undoubtedly, our eating habits are also greatly influenced by the environment we live in. It is full of stress and haste, and such an environment prevents us from developing healthy eating habits. However, eating habits are not merely the consequence of the environment, nor are they completely an individual's free choice. The truth of the matter is that, apart from the environment, it is also our genetic makeup that influences our eating habits.



# SWEET TREATS INTAKE

Have you ever noticed that some people opt for sweet treats more often than others? Or, perhaps you are asking yourself why it is precisely you who finds it hard to resist sweet treats during the day? Perhaps it is not only your decisions that are to blame because it has been discovered in a recent study that one of your genes is also responsible for this. Scientists have discovered that a tendency for sweet treats can be predicted from the genetic makeup of an individual.

It has been proven that the **ADRA2A gene** is responsible for this characteristic, as it is involved in the transfer of messages to the brain, where the information from the environment is appropriately processed and interpreted. More than 1,000 people participated in the research, and they had to record all the food they had consumed over an extended period of time. It has been proven that people with an unfavourable ADRA2A gene variant reach for sweet products much sooner than those who do not have this variant.



YOUR RESULT:

## LOWER TENDENCY

You have one favourable and one unfavourable copy of the ADRA2A gene present, determining a lower tendency for sweet treats. Approximately 42 percent of people have such a genetic makeup.

### Recommendations:

- If there are still days when you cannot resist them, we recommend that you stick to the following recommendations.
- When you are overpowered by the urge to have something sweet and you are at home, clean your teeth immediately. This will discourage you from eating sweet food, and if you eat it anyway, it will have an unpleasant taste.
- Instead of unhealthy vices choose healthy fruits, which also contain a lot of sugars, but your body burns them more slowly.
- Rice waffles covered with dark chocolate are also great substitutes for sweet vices.
- When you have successfully fought your sweet cravings a couple of times, this urge will start to decline.

*Do a simple test. Put a small amount of sugar on your tongue. At first, you'll feel the sweet taste, which, after several repetitions of this test will become less definite. Is this not proof that you can limit your consumption of foods containing white sugar?*

#### FACT

The average person consumes 33.1 kg of sugar per year.

#### HOW TO LOWER IT?

Use spices like cinnamon, cloves and vanilla, instead of sugar, for a sweeter taste of food.

#### SOURCES

Chocolate, candy, baked goods, candied nuts or fruits.

# SATIETY AND HUNGER

**Satiety** can be described as the feeling of a full stomach after a meal, while hunger is the feeling of the need for food. Scientists have discovered the link between the feeling of satiety and the **FTO gene**. This is a gene known to influence the individual's body weight (possibly through the detection of satiety). It has been proven in the scientific research that the carriers of one unfavourable copy of the FTO gene find it two times harder to reach the feeling of satiety, while the probability of carriers of two unfavourable copies of the gene to reach the feeling of satiety is four times smaller compared to people with two favourable copies. People who find it harder to reach the feeling of satiety usually eat more than those with a normal feeling of satiety and often without reaching the desired feeling.

**Hunger** is also a complicated mechanism which is set in motion when there is a lack of food in the body. Namely, it is regulated by a part of the brain, called the hypothalamus. In addition to body weight, amount of sleep, food and other environmental factors, the genetic makeup also influences the detection of hunger. It has been discovered in a study that people with an unfavourable NMB gene variant are almost two times more prone to feeling hunger than people who do not have this variant of the gene.



YOUR RESULT:

## HIGH TENDENCY FOR INSATIABILITY AND HUNGER

You are the carrier of one favourable and one unfavourable copy of the FTO gene, which determines that you find it twice as hard to reach the feeling of satiety. In addition to this, you have two unfavourable copies of the NMB gene present, and this determines a higher genetic tendency for the feeling of hunger.

### Recommendations:

- We recommend that you try to avoid soft drinks and other artificial drinks as much as possible because they will not give you the feeling of satiety, although they are full of calories.
- Eat food with more fibre. Namely, fibre is digested longer and, therefore, contributes to a longer feeling of satiety and decreases the feeling of hunger. Great sources of fibre are various vegetables (beans, artichokes, spinach, cabbage), bananas and whole wheat cereal. When buying them, read the food labels and choose products high in fibre and low in added sugars.
- Be sure that you get enough sleep because a reduced amount of sleep increases the feeling of hunger and decreases satiety.
- You can effectively reduce your appetite with a cup of coffee or any other preparations that contain caffeine. In doing so, consider your daily recommended dosage recommended on a basis of your genetic result.

*An uncontrollable desire for food despite a full stomach shows that actually you're not hungry. For many people food represents solace and situations of emotional instability; stress and boredom often trigger the desire for food. It is possible that you are not hungry, but your body is dehydrated! Many people confuse feeling thirsty for hunger, when in fact they could quench their "hunger" with a glass of water.*

#### FACT

Foods with the same calorific value can have a different satiety value.

#### EVOLUTIONARY ROLE

Unexpected food shortages have caused humans to become hungry when anticipating food.

#### FOODS WITH GREAT SATIETY VALUE

Meat, fish, potatoes, wholemeal pasta, baked beans, porridge, fruits.

## PERCEPTION OF SWEET TASTE

**Tasting** is a process in which smell and sight also play an important role, but the main organ for tasting is actually the tongue. The tongue is covered with numerous taste buds which contain taste receptors. When they come in contact with a certain substance, a signal is transmitted to the brain, which then tells us what the taste of the substance is. Based on this we differentiate four basic tastes: sweet, salty, sour and bitter.

An important gene which determines the intensity of the perception of sweet taste is the **SLC2A2 gene**. Scientists discovered its role in a study that observed the relation of SLC2A2 gene variants to food type and, consequently, the sugar amounts that people consume.

It has turned out that people with an unfavourable variant of the SLC2A2 gene consume daily much more sugar than people with a favourable variant. The reason for this is a less intensive perception of sweet taste. As a result, carriers of the unfavourable variant of the SLC2A2 gene tend to sweeten their food much more for the same effect.



YOUR RESULT:

**MORE INTENSIVE**

You are the carrier of a favourable SLC2A2 genetic makeup, and your perception of sweet taste is, therefore, more intensive. 73 percent of people have such a genetic makeup.

### Recommendations:

- Your genetic makeup determines a more intensive perception of sweet taste, which is, in this case, favourable.
- We recommend that you dilute excessively sweet juices with water or mineral water because they will still retain enough of their sweetness.
- We do not recommend that you sweeten hot drinks. Due to your favourable genetic makeup, your body will, quickly adapt to this, and later you will no longer miss sugar at all.
- Your intensive sweet taste perception is an additional reason for limiting the intake and excessive use of white sugar. Such sugar can damage your teeth and has negative impacts on your whole health and well-being.

*The only mammals that do not taste sweet are the cat family. On their taste buds cats do not have receptors to detect sweet taste. According to scientists, one of the only two genes that are required for the formation of the sweet receptor has become non-functional. Unlike dogs, cats, therefore, are simply not moved by candy.*

#### FACT

Adding more red colour to a drink increases its perceived sweetness.

#### EVOLUTIONARY ROLE

From an evolutionary perspective, sweetness indicated energy-dense foods.

#### SOURCES

Simple carbohydrates (sucrose, fructose, lactose, etc.), aldehydes, ketones, some proteins.

# PERCEPTION OF BITTER TASTE

A bitter taste is one of the four basic tastes that we differentiate. Its perception passes through taste receptors which communicate it to the brain which then tells us which taste is in question. However, bitter taste perception is not equally effective in all people. The described mechanism can have flaws that are expressed in a less intensive perception of bitter taste.

Scientists have discovered that the **TAS2R38 gene** is responsible for the different susceptibility to bitter taste. Approximately 80 percent of people in the study who were carriers of two common copies of the TAS2R38 gene, did not detect a bitter taste. The ability to taste bitter has been determined by the ability to taste a special substance, called 6-N propylthiouracil (PROP). PROP is not normally found in nature, but the ability to taste this substance is closely connected to the ability to taste other related bitter substances, which can be found in broccoli, cabbage, coffee, tonic and some beers. Are you interested in finding out what tastes these foods have for you?



YOUR RESULT:

## MORE INTENSIVE

You are the carrier of one common and one rarer copy of the TAS2R38 gene, and you, therefore, perceive bitter taste more intensively.

### Recommendations:

- Bitter substances, which you most likely can taste, can be found in kale, radicchio, olives, coffee, tonic and some beers.
- These substances play an important role in digestion, so do not leave them out of your meals just because of their bitter taste. However, if you truly find them very unpleasant, we have the following advice.
- We recommend the choice of spring vegetables, because of their less bitter taste.
- Sauté the vegetables you find bitter. You will reduce the content of substances which cause the bitter taste, as the bitter substances are removed with the drained water.
- You can prepare these foods in a soup, with pasta or by adding your favourite spices, which will tone down the bitter taste.

*Favourable or unfavourable feelings to taste have evolutionary significance, since they enabled survival. Substances of very sweet taste evoke pleasurable sensations, as opposed to bitter substances, which discourage people from ingestion. This fact has allowed the separation of high-calorie food sources or potentially toxic substances such as certain alkaloids, which have a bitter taste.*

#### FACT

Bitters are used in digestifs, alcoholic beverages served after a meal to aid digestion.

#### EVOLUTIONARY ROLE

From an evolutionary perspective, bitterness indicated toxicity.

#### SOURCES

Coffee, unsweetened cocoa, olives, citrus peel, dandelion greens, hops.



# THE EFFECTIVENESS OF YOUR METABOLISM

## GENES HELP YOU LEARN ABOUT YOUR BODY'S METABOLISM

With the help of specific enzymes, the body processes or breaks down lactose, caffeine and alcohol after their consumption. This enables them to be used as nutrients or prevents these substances from becoming harmful. If a certain enzyme does not function optimally, an inappropriate adaptation can lead to certain health problems.

Lactose intolerance is one of the well-known phenomena, where lactase, an enzyme which is responsible for breaking down milk sugar lactose, is lacking. In the case of lactose intolerance, our body cannot break down milk sugar, and lactose intolerant people have many problems, such as diarrhoea, bloating and vomiting when eating dairy products. Among the important processes are the metabolism of alcohol and caffeine. For both of them, a slow and ineffective metabolism is problematic. In this chapter, you will find out about your response to those substances and according to your genetic makeup, you will be given the most suitable recommendations.



## ALCOHOL METABOLISM

Have you ever wondered why some people's faces become red and they experience headaches, nausea and increased heart rate after consuming the slightest amount of alcohol? Well, scientists have succeeded in clarifying this phenomenon on a molecular level. Namely, the reason for this is the defect of the gene which codes for the enzyme ALDH2. This enzyme is responsible for the breakdown of acetaldehyde – an intermediate product in ethanol metabolism, which is even more toxic than ethanol itself. In people with a defect of the **ALDH2 gene**, acetaldehyde accumulates, and this is the reason why they usually avoid drinking. Despite the fact that this defect is more characteristic of Asians, it does occur in other peoples as well.

Also, enzyme ADH1 is important for alcohol metabolism as it is responsible for the first stage of the metabolism of ethanol into acetaldehyde. Researchers have discovered that a mutation can also occur in the genes that encode the ADH1 enzyme and this greatly influences the efficiency of ethanol conversion. These mutations are actually not as defining as the one in the **ALDH2 gene**, but they still greatly determine alcohol sensitivity.



YOUR RESULT:

### EFFECTIVE METABOLISM

**Your genetic makeup determines an effective alcohol metabolism. Namely, you are the carrier of the most favourable genetic combination.**

### Recommendations:

- Your genetic makeup determines that you don't experience any problems related to the accumulation of harmful substances from alcohol metabolism.
- When drinking alcohol in moderation, you do not get any typical signs such as redness of the face, headache, nausea or unpleasant itching and increased heart rate.
- We advise you to drink in moderation, because excessive alcohol drinking can have many negative consequences – medical and sociological ones.
- 1 dl of wine or 2 dl of beer per day is still recommendable, as it increases the levels of good (HDL) cholesterol. However, we do advise against higher amounts of alcohol.
- Despite an effective alcohol metabolism, we recommend that you avoid drinking alcohol during and after physical activity.

*It is well known that the French are not stingy when it comes to using fat in preparing their meals. They eat more butter, cheese and pork than Americans, but their frequency of cardiovascular diseases is lower. The fact that the French consume large amounts of red wine is believed to be the secret of their success. Scientists have named this phenomenon the French paradox.*

#### FACT

Because alcohol is made from sugar or starch, it contains lots of calories, 7 kcal/gram, to be exact.

#### HEALTH IMPACT

Small quantities (1 drink/day) are associated with a decreased risk of heart disease, stroke, diabetes, and early death.

#### SOURCES

Alcoholic drinks (beer, cider, wine, whisky, vodka, etc.).

## CAFFEINE METABOLISM

**Caffeine** is a natural alkaloid, most commonly known as the main ingredient of coffee. It is metabolised in the liver by the enzyme CYP1A2. This enzyme is responsible for up to 95 percent of the entire caffeine metabolism, and it is, therefore, not surprising that a mutation in the **CYP1A2 gene** has an important influence on the enzyme activity and, consequently, the caffeine metabolism.

People with one or two mutated copies of the CYP1A2 gene metabolise caffeine more slowly, and as a result, feel a greater effect of coffee. But this is not as favourable as it may seem, because these people have a higher blood pressure after drinking coffee than those with a rapid caffeine metabolism. Researchers have proven in many studies that people with slower caffeine metabolism are more susceptible to medical conditions related to increased blood pressure. We, therefore, recommend they adjust the daily dose of caffeine accordingly.



YOUR RESULT:

### SLOW METABOLISM

**You are the carrier of two unfavourable copies of the CYP1A2 gene, which determine a slow caffeine metabolism. Among Caucasians, there is approximately 48 percent of people, who, similarly to you, metabolise caffeine slowly.**

#### Recommendations:

- You are the carrier of a genotype that determines that caffeine is slowly removed from your body.
- We recommend that you limit coffee consumption accordingly. By drinking more than one cup of coffee a day you increase the risk for health complications related to increased blood pressure.
- If coffee represents a ritual for you, you can replace it with corresponding coffee substitutes, for example, barley coffee, which does not contain caffeine.
- Black tea is also a good alternative. In black tea the stimulating feeling occurs later; it is weaker and it lasts longer than in coffee. In addition, green tea mostly contains more antioxidants and vitamins than regular coffee.

#### FACT

Caffeine is the world's most popular psychoactive substance, with more than 120,000 tonnes consumed per year.

#### HEALTH IMPACT

Moderate consumption may offer protection from liver cirrhosis and reduce the risk of type 2 diabetes.

#### SOURCES

Coffee, energy drinks, tea, chocolate.

*A creeping plant originating in the Amazon, guarana, contains a substance called guaranine, which is almost identical to caffeine. Twice the amount of guaranine is present in guarana in comparison to caffeine in coffee beans. Guaranine is a caffeine alternative in some carbonated drinks and energy drinks.*

# LACTOSE INTOLERANCE

Milk provides the first and most important nutritional ingredient for every baby and child. With the exception of lactose intolerant people, it retains its nutritional value in the diet of adults as well. Lactose intolerant people, though, do not have the enzyme lactase which is responsible for the breakdown of milk sugar lactose, and this is why they have to limit milk consumption. The reason for the absence of the lactase enzyme is the **MCM6 gene**, which is actually not functionally related to lactose metabolism, but it regulates the activity of **LCT** (a gene which encodes for the lactase enzyme) and it consequently determines whether we will have the lactase enzyme or not.

Lactose intolerant people experience the accumulation of lactose in their colon, where it is decomposed by intestinal bacteria. Various fats are formed, as well as gasses and other molecules. The consequences are diarrhoea, a bloated stomach and stomach cramps. We can also experience nausea or vomiting. These signs occur 15 minutes to 2 hours after the consumption of milk or dairy products, and they depend on the amount of lactose we consume, age and health condition.



YOUR RESULT:

## INEFFECTIVE METABOLISM

Your genetic makeup determines that you are lactose intolerant. You have two unfavourable copies of the MCM6 gene present, which determines a much-decreased amount or total absence of the lactase enzyme.

### Recommendations:

- Despite the unfavourable genetic makeup, it is highly likely that you do tolerate a certain amount of lactose. Most lactose intolerant people can, without trouble, consume 8-10 g of lactose daily, some even 50 g, but highly sensitive people have to limit it to 1 g daily at most.
- We recommend that you follow your reaction to consumed lactose, and determine how much lactose you tolerate.
- Taking your reaction to lactose into consideration, think about other recommendations of the report, as it might be good to avoid some dairy products which are recommended in other chapters.
- In the case of high sensitivity, pay attention to food labels on processed meat, margarine, bread, cereal, instant soups and gravies, cake mixes, and biscuits, because lactose can also be present in non-dairy foods.
- Food supplements which contain the lactase enzyme are also available.
- Some probiotic yoghurts can also alleviate the symptoms. In addition to reduced lactose content, their bacterial content also favourably influences the establishment of balance in the intestinal flora and the alleviation of lactose intolerance.

*According to some estimates, 30 to 50 million Americans, 60 to 80 percent of Asians, 60 to 80 percent of African Americans and 50 to 80 percent of Latinos have lactose intolerance. Lactose intolerance is the least common among indigenous peoples of northern Europe, where it occurs in around 2 percent of the population.*

### FACT

Lactose intolerance varies greatly from 10% in Northern Europe to 95% in parts of Asia and Africa.

### HEALTH IMPACT

People with lactose intolerance may have symptoms such as abdominal pain, bloating, diarrhoea, flatulence and nausea.

### SOURCES

Milk and dairy products.

## GLUTEN INTOLERANCE

**Gluten** is a general name for the protein which is best known for its presence in wheat, rye, barley, kamut, spelt and some others. It helps foods maintain their shape, acting as a glue that holds it together. This is why it's often added to processed and packaged foods. For instance, candy, sauces, snack foods and hot dogs are very likely to contain gluten. Generally, gluten is not bad for your body, unless you are gluten-intolerant. This means your body responds negatively to ingested gluten. There are various forms of gluten-related reactions, but the most common ones are: coeliac disease, wheat allergy and non-coeliac gluten sensitivity. In these cases, a gluten-free diet is recommended, since the body produces an immune response when breaking down gluten during digestion. The healthiest way is to seek out naturally gluten-free food groups. These include fruits, vegetables, meat, fish, seafood, dairy, beans, legumes and nuts. Buckwheat, millet and maize are also gluten-free. Try to avoid highly processed foods.

The genes that we have analysed are **DQA1** and **DQB1**, which tags for HLA-DQ2.5 and HLA-DQ8. Most gluten-intolerant patients have the variant present in both genes. However, the presence of the variant itself doesn't mean that you are gluten intolerant, since research shows genetic variants are also present in 30 percent of healthy people. However, the percentage of gluten-intolerant patients with the presence of these variants is much higher. More than 95 percent of patients with coeliac disease and 50 percent of patients with non-coeliac gluten sensitivity have mutations present in both of these two genes. Other types of gluten-related disorders, such as wheat allergy or dermatitis, are not linked to the analysed genes.



YOUR RESULT:

**LOW LIKELIHOOD**

Our analysis has shown that your genetic makeup determines lower likelihood for gluten intolerance.

### Recommendations:

- Your genetic makeup determines that you most probably do not experience any problems when metabolising gluten.
- Based on your genetic result, there's no reason to omit eating food which, for instance, contains wheat, rye, barley, kamut and spelt.
- We recommend you eat as diversely as possible and not to try either omit or increase the intake of gluten.
- As already stated, the genes that indicate gluten intolerance are found in only 50 percent of people with non-coeliac gluten sensitivity, so there is a chance that you are in the other half. If you experience problems such as gas, bloating, diarrhoea, constipation, and also fatigue, "brain fog" or feeling tired after consuming gluten, consider going on a gluten-free diet and consult with your doctor. Have in mind that gluten can be found in many food products, therefore you need to carefully read the declarations and you should not forget about sufficient intake of fibre.

*Some promote a gluten-free diet as a way to lose weight, or as a healthy diet for the general population. These claims are ungrounded. The gluten-free diet is healthier for people with gluten-related disorders, but there is no evidence that it is beneficial for people who do not have these conditions.*

### FACT

Coeliac disease affects only 1–2% of the general population.

### HEALTH IMPACT

People with non-coeliac gluten sensitivity may have symptoms such as diarrhea, constipation, abdominal pain.

### SOURCES

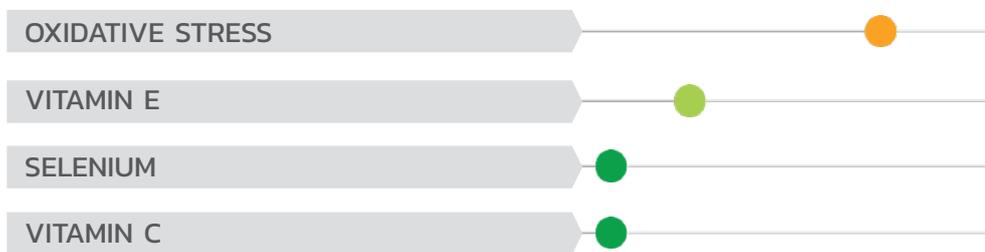
Wheat, barley, rye, oats, spelt, kamut, etc.



# YOUR GENES, DETOXIFICATION AND ANTIOXIDANTS

## GENES CAN ALSO INFLUENCE YOUR PHYSICAL APPEARANCE

In this chapter you will learn about your selenium and vitamin C and E levels that are determined by your genetic makeup, and how effective the detoxification mechanisms of your body are. Harmful substances enter our body daily through food, water and air and we desperately need mechanisms that are responsible for detoxification and removal of these substances from our systems. These mechanisms include specific enzymes that detoxify our body, and antioxidants that neutralise free radicals. The formation of free radicals is caused by radiation, cigarette smoke, various pollutants and countless other substances which our body can successfully detoxify with the help of appropriate enzymes. However, a mutation can occur in the genetic makeup of the enzymes, which is then expressed as ineffective detoxification of the above-mentioned potentially harmful and toxic substances. In the case of an ineffective enzyme function or the lack of a certain enzyme, we are largely exposed to the toxins from the environment, and we have to adapt accordingly.



## OXIDATIVE STRESS

Oxidative stress occurs as a consequence of an imbalance between the formation of free radicals and the ability of our body to neutralise them in time. Our body actually has many enzymes available for preventing oxidative stress. These enzymes are responsible for protection against harmful environmental influences such as cigarette smoke, exhausts, smog, radiation, vapour from industrial solvents used for the production of plastic mass, medication, etc. Two of the most important enzymes are quinone oxidoreductase and catalase. A mutation of DNA can occur in both genes, and this influences their functioning and our exposure to oxidative stress. We have analysed the sequences of the two mentioned genes, and determined, on the basis of the genetic makeup, the extent to which you are exposed to oxidative stress.



YOUR RESULT:

### HIGHER EXPOSURE

Your genetic makeup determines the absence of the enzyme quinone oxidoreductase and a reduced activity of the catalase enzyme, manifesting in higher exposure to oxidative stress.

### Recommendations:

- Follow the recommendations for daily selenium, zinc and vitamin E intake, because you will reach better result than with excessive eating of only one antioxidant.
- We recommend beetroot and green pepper, kiwi, lemons, cranberries, strawberries, blackcurrants or cabbage, where there is plenty of vitamin C.
- We recommend eating foods which contain plenty of coenzyme Q10, because it is an important antioxidant. It can be found, mostly, in meat (beef, chicken), fish (mackerel, sardines) and nuts.
- Opt for red and orange vegetables and fruit, because they contain a lot of beta carotene, which enables a better effect of antioxidants.
- Avoid smoking, because it enables additional formation of free radicals in our body.
- A group of substances called flavonoids, for example quercetin, epicatechin and oligomeric proanthocyanidins, are also among important antioxidants. They are found in green tea, citruses, ginkgo, wine and dark chocolate.

#### FACT

It may also be beneficial, as free radicals can be used by the immune system to kill pathogens.

#### EVOLUTIONARY ROLE

Oxidative and other environmental stresses have driven the evolution process.

#### WHAT INCREASES IT?

A diet high in sugar, fat and alcohol, smoking, radiation, pollution.

#### WHAT DECREASES IT?

Selenium, vitamins A, C and E, fresh fruit and vegetables.

*Did you know that by storing fresh fruits their vitamin C content drops? The level drops by 50 percent when stored in the cold, and when stored under normal temperature by spring the level has dropped to 2/3 of the after-harvest level. Thus, it is best to consume raw fruits and vegetables to ensure we consume more of this antioxidant.*

## VITAMIN E

**Vitamin E**, also known as tocopherol, is the most important representative of fat-soluble antioxidants. Its importance is illustrated by the fact that certain people lacking vitamin E are more prone to chronic diseases, while people with a higher vitamin E level have fewer health problems and even slightly better physical abilities.

Scientists have started to ask themselves why differences in vitamin E levels among people even occur. They have discovered that the reason is not only food. Scientific research has proven that a favourable mutation can occur in the **APOA5 gene** increasing the vitamin E level. People with such a genetic makeup have already a higher vitamin E level to start with, and as a result they need a lower daily intake of vitamin E for an optimal state. People with a common variant of the APOA5 gene have to include foods with more vitamin E into their menus, in order to ensure an optimal state.



YOUR RESULT:

**HIGHER LEVEL**

**Your genotype determines a higher vitamin E level in the blood, because one copy of your APOA5 gene is present in a favourable variant. Such a genetic makeup is actually quite rare.**

### Recommendations:

- We recommend you consume 14 mg of vitamin E daily.
- Good sources of vitamin E are, predominantly, oils (sunflower and rapeseed oil) and nuts (pine nuts and Brazil nuts).
- When shopping, read the food labels and be sure about the amount of vitamin E that a certain product contains.
- In frozen foods the vitamin E content slowly decreases, so eat fresh fish and meat whenever possible.
- Vitamin E regenerates in the body with the help of vitamin C, and we recommend the consumption of citruses, forest berries, and red and green peppers full of vitamin C.

#### WHY DO WE NEED IT?

Oxidative stress protection.

#### CAN WE PRODUCE IT?

No.

#### SYMPTOMS OF DEFICIENCY

Nervous system problems, weakened immune system.

#### SOURCES

Wheat germ, olive and sunflower oil, almonds, pine nuts, peanuts.

*Vitamin E is present in eight different forms, which differ in biological activity. The most active and also the most common form of vitamin E in the body is alpha-tocopherol. The synthetic form of alpha-tocopherol is only about half as active as the natural one, therefore it is necessary to consume twice the amount for the same effect.*

# SELENIUM

**Selenium** is one of the very important minerals, because it functions as an antioxidant in your body. It forms an uncommon amino acid, selenocysteine that is needed for the functioning of over twenty enzymes. One of the best known of them is selenoprotein P that has antioxidative properties also characteristic of other selenoproteins. Numerous studies have shown that a high selenium level in our body has a direct anticarcinogenic and overall protective effect on our health.

It has been discovered in scientific research that two polymorphisms are present in the **SEPP-1 gene**, which is responsible for selenium transport, and they influence the selenium levels in our body. Scientists have additionally discovered that selenium level is also determined by our BMI. An unfavourable combination of the genetic makeup and the BMI can influence lower selenium level by up to 24 mcg. In this case, an appropriate dietary adaptation is recommended.



YOUR RESULT:

**HIGHER LEVEL**

The genetic analysis has shown that you are the carrier of the variant of the SEPP-1 gene determining a higher selenium level in your body, which is favourable.

## Recommendations:

- Despite favourable genetic makeup, be careful because your selenium needs are determined by your BMI.
- Considering the fact that you are the carrier of a favourable genetic makeup, and your BMI is below 30, we recommend you consume more than 40 mcg of selenium daily.
- If your BMI increases above 30, we recommend consuming twice as much selenium per day.
- Selenium is present in many foods so with a diverse choice of foods you will fulfil your daily requirements.
- We recommend eating a diverse range of foods from the group of cereals, fish and meat, where selenium is most present.
- For a more detailed following of our recommendations, we advise continuous use of the nutrition charts.

*A typical sign of people who consume excessive amounts of selenium is a characteristic smell of garlic, even if the person hasn't consumed any. By taking into account our recommendations this could not occur, as the person would need to consume 100 times more selenium than the recommended value.*



### WHY DO WE NEED IT?

Oxidative stress protection, immune system function, sperm production.

### CAN WE PRODUCE IT?

No.

### SYMPTOMS OF DEFICIENCY

Hair loss, skin changes, infertility, atherosclerosis, kidney and heart problems.

### SOURCES

Brazil nuts, liver, sardines, lentils, oats.

# VITAMIN C

**Vitamin C**, also known as ascorbic acid, is a water-soluble vitamin, found in different kinds of fruits and vegetables. Our body is not able to synthesise vitamin C, which means sufficient intake of vitamin C is very important for our health. Its primary function is boosting our immune system. It protects cells and keeps them healthy, prevents scurvy and helps with the healing of wounds. It is also important for collagen production, while it's also known to help with lowering hypertension.

Dietary vitamin C is transported in the human body by two transporter proteins, one of which is encoded by the **SLC23A1 gene**. A variant of this gene causes reduced absorption of vitamin C and is associated with a lower level of plasma vitamin C. The SLC23A1 gene was identified to be associated with circulating concentrations of L-ascorbic acid in the general population, which indicates that people with the mutation present should increase their intake of vitamin C.



YOUR RESULT:

**HIGH LEVEL**

You are a carrier of a favourable genetic makeup, which determines that you shouldn't experience problems related to vitamin C absorption.

## Recommendations:

- Your genetic makeup protects you from a lack of vitamin C. To maintain this, we suggest you follow our recommendations and keep it on a similar level.
- We suggest you consume around 100 mg of vitamin C with food per day. Such an intake should maintain your vitamin C at a similar level.
- To maintain an appropriate level of vitamin C, we suggest you eat a moderate amount of vegetables such as turnips, cabbage, peas, Brussels sprouts and potatoes; and fruits, namely strawberries, pineapple, guava and apricots.
- To additionally diversify your diet and keep a healthy level of vitamin C you can introduce star fruit, litchis, kumquats, sun-dried tomatoes and saffron to your meal plan.

### WHY DO WE NEED IT?

Immune system function, tiredness and fatigue prevention, iron absorption.

### CAN WE PRODUCE IT?

No.

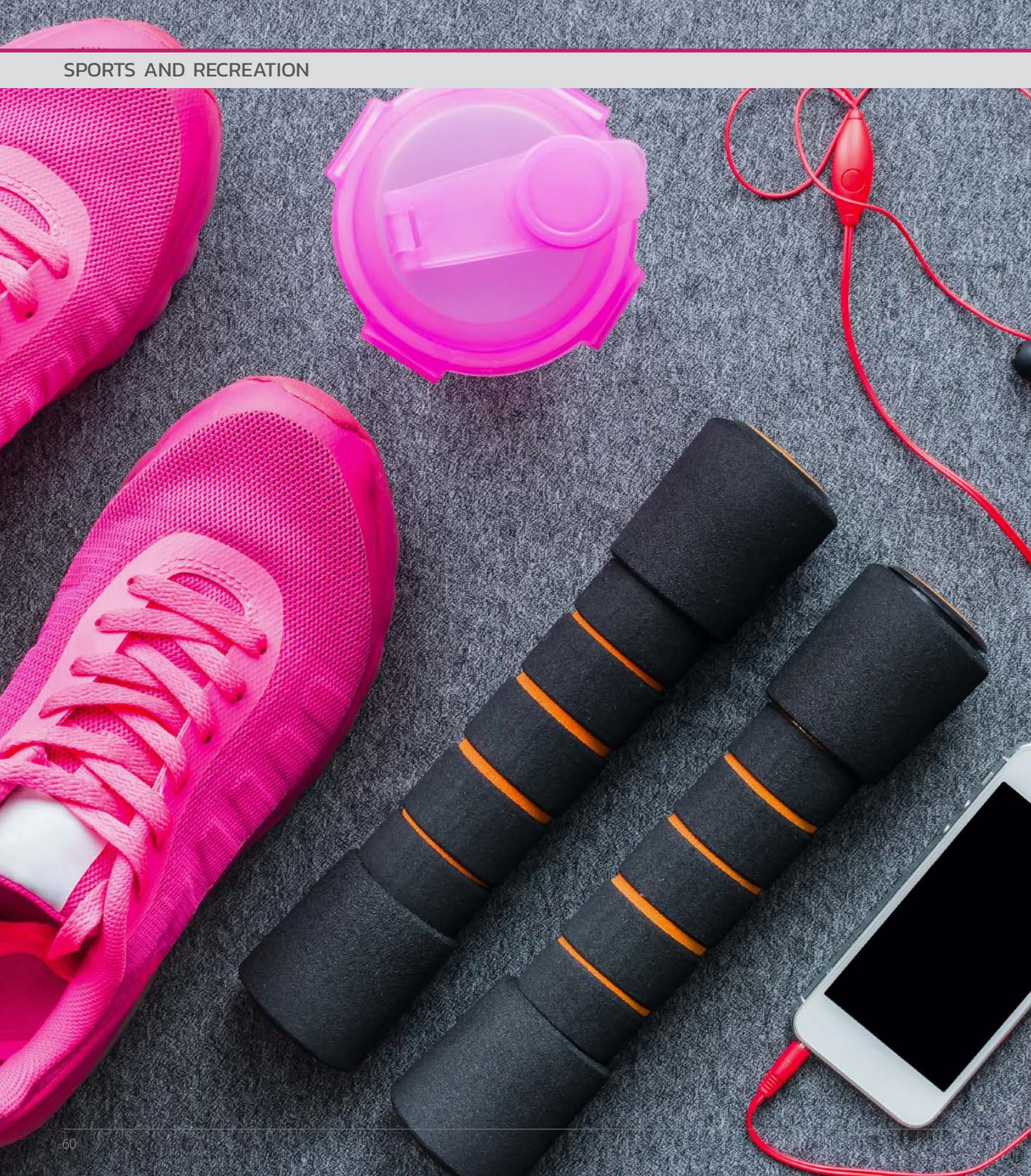
### SYMPTOMS OF DEFICIENCY

Scurvy, bleeding gums, loss of teeth, slow wound-healing, easy bruising.

### SOURCES

Blackcurrant, red bell pepper, kale, broccoli, rose hip, acerola.

*English sailors were called limeys because they sucked on limes to prevent scurvy. Scurvy is commonly associated with sailors in the 16th to 18th centuries who navigated long voyages without sufficient vitamin C. Its symptoms are general weakness, anaemia, gingivitis (gum disease), and skin haemorrhages.*

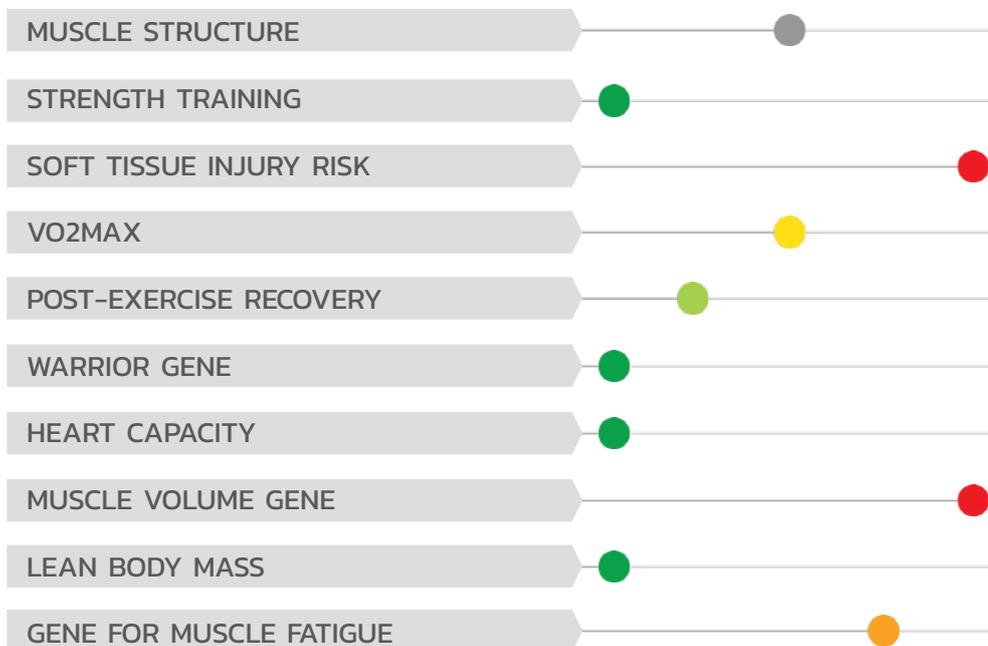


# SPORTS AND RECREATION IN TUNE WITH YOUR GENES

## DISCOVER THE WORKOUT MOST SUITABLE FOR YOU

In this chapter we will reveal to you the sports activities that you can be good at on the basis of your muscle structure. You will learn to what extent you are prone to soft tissue injuries. You will also learn about your aerobic potential and post-exercise recovery. You will find out how beneficial a certain type of training is for you. Physical activity affects our health generally positively, but certain sports activities are more beneficial for some than they are for others.

As an example, scientists have discovered that a certain type of recreation can benefit some people, while the influence of it on others can be less optimal, or can even affect the accumulation of fatty tissue. All this strongly depends on our genetic makeup. For instance, genetics has a great influence over components of the athletic performance such as strength, power, endurance, muscle fibre size and composition, flexibility, neuromuscular coordination, temperament and other phenotypes. And this is precisely why we can, with the help of your DNA analysis, give you supportive recommendations, which help you on your way towards the desired goals.



# MUSCLE STRUCTURE

This analysis holds answers about your muscle type and assesses your strength/endurance performance potential. We test two genetic variants within the **ACTN3 gene** and the **PPAR-alpha gene**, which affect our physical fitness and greatly influence the fact that some people are better at sports where strength and power are required, while others are “marathoners” in their nature.

A study by Australian scientists included more than 400 top athletes divided into two groups. The first group included athletes from disciplines where mostly strength and speed are needed, and the other group included those who required endurance. They discovered that, in the first group, people with two copies of a functioning ACTN3 gene prevailed, and, in the second group, people with two copies of a non-functioning ACTN3 gene prevailed. It has, therefore, been proven that the mentioned gene determines the effectiveness of a specific type of muscle fibre. In addition to this gene, a mutation in the PPAR-alpha gene is also known. The PPAR-alpha gene determines the representation of a specific type of muscle fibre in our body. By simultaneously analysing both genes it is possible to predict the activities that you are likely to be the most successful at.



## YOUR RESULT: GREAT STRENGTH AND EXPLOSIVENESS OF MUSCLES

The variants of the **ACTN3** and **PPAR-alpha** genes give you an advantage in a sprint and other sports where strength and explosiveness are required.

### Recommendations:

- Your genotype is very common in sprinters, since it determines that your muscles are stronger and more explosive, but have less endurance.
- The physical activities most suitable for your muscle type are short-distance running (sprints), high jump and long jump, karate and other martial arts, gymnastics disciplines, powerlifting and weightlifting.
- If you are a beginner, you should first build a firm strength foundation, based on multi-joint functional movements, such as squat, lunge, push and pulling patterns.
- Gradually advancing from lighter loads and higher reps for motor learning to higher intensity maximal strength training protocols, you should give your body enough time to make appropriate adaptations.
- Once you are strong enough to deal with more advanced explosive strength training regimens, you can start incorporating plyometrics and/or weightlifting into your training sessions.
- At least 2 strength training sessions per week are recommended.
- It is also highly beneficial to work with a certified strength and conditioning expert to maximise your strength potential and to avoid related injuries.
- However, you should know that with a different type of training, you can manipulate the different type of muscles you want to improve, since genetics contributes only to a certain extent, while the remaining part is the effort you make.

#### FACT

On average skeletal muscles form 36% of female body mass and 42% male body mass.

#### WHAT INCREASES IT?

Regular exercise, protein-rich diet.

#### WHAT DECREASES IT?

Lack of exercise, serious illness, operation recovery.

## MUSCLE STRUCTURE, BODY AND TRAINING

Distribution of fibre types in each body is not homogenic. Most people have a similar percentage of slow-twitch and fast-twitch fibre distribution, which makes us humans a hybrid, universal athletes, potentially good in aerobic and strength tasks. So, having an extra-high dominance of any kind of fibre is more an exception than the norm. Deeper muscles, which are closer to the skeleton tend to be slow, which, together with their mechanical properties make them better stabiliser muscles. On the contrary, superficial, global muscles tend to have a fast-twitch fibre dominance, which, together with their leverage advantages, makes them better movers and moment producers.

The relationship between intensity, reps and sets with the associated type of adaptation.

One-rep maximum (1RM)	Approximate number of repetitions	Optimal number of sets (look at Note)	Training effect
95-100	1 to 3	10-20	Max strength
85-95	3 to 6	5-10	Strength
75-85	6 to 10	3-6	Hypertrophy & endurance
65-75	10 to 20	2-5	Explosive power, endurance, some hypertrophy
55-65	20 to 35	1-3	Endurance

*Note: All the numbers in the table are approximate, since the number of reps with a given load depends on few other factors, such as fibre dominance (slow-twitch or fast-twitch), the muscle groups involved (arms, legs or a torso) and gender (male or female).*



# STRENGTH TRAINING

Strength training can be defined as the use of resistance (e.g. barbells, dumbbells, rubber bands or bodyweight) for contracting muscles with the objective of acquiring strength, muscle size or muscle endurance. If performed correctly, strength training can improve overall health and well-being, as well as bone health. It reduces the potential for injury and improves heart function. Strength training is associated with muscle tissue gain, and it is usually recommended for those who want to get rid of excess fat since a more “muscular body” burns more calories. It turns out that, according to our genetic makeup, different people respond to strength training in a different manner.

The scientific research studied people who had gone through a 12-week strength training programme, which progressively increased in intensity (aggressively increasing the amount of weight during the programme). In addition to an expected positive outcome, after finishing the programme some people had gained approximately 6 percent more subcutaneous fat than others. This phenomenon is proven to happen in men due to their genetic uniqueness that influences their susceptibility to certain types of physical exercise. In the case of women, these findings are not confirmed. This is not surprising because men and women have a unique inimitable system of fat accumulation and fat burning.



YOUR RESULT:

## NORMALLY RECOMMENDED

**You have two common copies of the INSIG2 gene present, and because of this strength training that increases in intensity is normally recommended for you. Around 54 percent of people in the population have such a genetic makeup.**

### Recommendations:

- If you would like to take up strength training, it is normally recommended for you.
- By correctly working out on fitness machines you may gain muscle mass without gaining excess fat at the same time.
- Consult a fitness trainer before working out on fitness machines, to determine the appropriate combination of exercises and to learn the correct form of exercise execution.
- It is important that you increase your training loads gradually, giving your body enough time to adapt without any negative outcome.

*Do you know why men have more muscle mass? The hormone testosterone is responsible for this – we all have it in the body, but young men have the highest levels. The link between the hormone testosterone and muscle mass is very strong. Intense exercising increases the levels of this hormone, so muscle strength is also increased.*

#### FACT

Free weights activate and work more muscles than machine weights.

#### EXAMPLES

Weight training, circuit training, isometric exercise, gymnastics, yoga, Pilates.

#### HEALTH IMPACT

Greater muscular strength, improved muscle tone, increased endurance and enhanced bone density.

# SOFT TISSUE INJURY RISK

The role of soft tissue is to connect, support or surround other structures of our body; therefore, it is quite exposed to injury. Soft tissue injury is an injury to the body that does not involve skeletal damage, cardiovascular damage, etc. It is the damage to ligaments, tendons and muscles and can occur when walking, running, doing some other, more burdensome activity or by performing some long-lasting repetitive movements.

Types of soft tissue injuries include acute injury and overuse injury. Symptoms of acute injuries develop rapidly, while overuse injuries occur as a result of repetitive friction, pulling, twisting, or compression that develops over time. Our genetic makeup can importantly contribute to being more susceptible to soft tissue injury and if this is the case, appropriate training, especially warming up is even more important. If you know you are prone to injuries, you can modify your training in order to avoid injuries in the future.



YOUR RESULT:

## HIGHER SOFT TISSUE INJURY RISK

**Analysis of your genes has shown that you have an overall higher risk for soft tissue injuries.**

**And you are the carrier of genetic variants, which are related to inflammation. This is an important information, since if you actually suffer from a softy tissue injury, more intensive inflammation processes can importantly affect your recovery in a negative way.**

### Recommendations:

- Due to your genetic result, we recommend that you increase your warm up duration & intensity, especially in cold environmental conditions.
- Include additional stretching and strengthening exercises in your weekly training programme.
- During warm up, increase speed or jump height gradually.
- Depending on the stability of your feet, soft beach sand running may be contra-indicated for you.
- A grass trail will also usually be more suitable than a pavement.
- Wear appropriate footwear that fits well and provides adequate support and traction for the playing surface. Have a sports biomechanics professional, rather than a "brand" shoe distributor fit you with the most appropriate training shoes.
- The shoes must feel comfortable; rotating between a few pairs of shoes is beneficial for better load distribution over time. Slightly worn-in shoes are better than brand new ones.
- We recommend that you avoid uphill training, excessive plyometric training or excessive speed training.
- After intensive training don't forget to massage your leg muscles (especially calf muscles) and Achilles tendon.
- The day after a game or high-intensity training or training on a hard surface, reduce the load on your tendons. You can go swimming or cycling.
- Encourage medical staff to check your tendons for any unusual findings, soreness, swelling, cracking or pain.
- If you feel pain, use ice pads for about 10–20 minutes.
- Maintain normal body weight or BMI < 25, since higher BMI poses a higher risk for injury.
- Drink water or rehydration drinks before, during and after physical activity.

#### FACT

It is not restricted to exercise and can happen while doing everyday tasks.

#### WHAT INCREASES IT?

Inappropriate sports shoes, exercising surface.

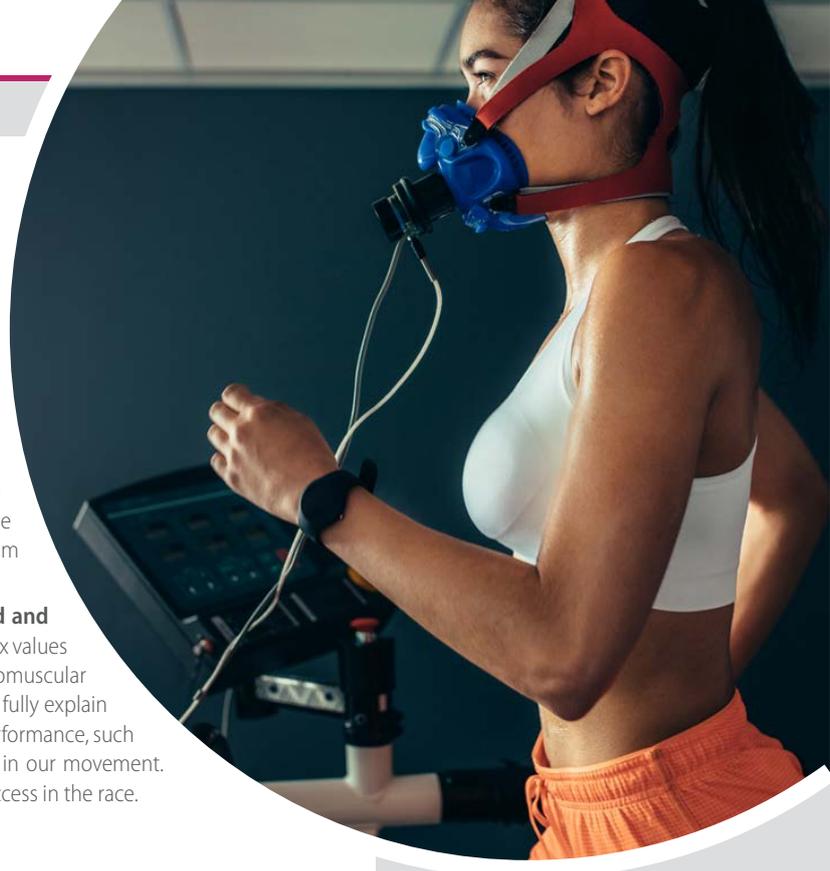
#### WHAT DECREASES IT?

Warming up before and stretching after exercise, normal body weight.

## VO<sub>2</sub>max (YOUR AEROBIC POTENTIAL)

When increasing exercise intensity, our consumption of oxygen increases, but only up to a certain point from which oxygen consumption no longer increases, even if we increase the intensity further. This is the **so-called VO<sub>2</sub>max point**. VO<sub>2</sub>max therefore greatly influences our capacity to perform endurance exercise. VO<sub>2</sub>max is the term for the maximum oxygen consumption of an individual and indicates the maximal volume of oxygen our body is able to use within one minute. It can be given as an absolute value in litres per minute (l/min) or relative value in millilitres of oxygen per kilogram of body weight per minute (ml/(kg x min)).

VO<sub>2</sub>max is partly determined **by the ability of the heart to pump blood and partly by the ability of the exercising tissues to use oxygen**. High VO<sub>2</sub>max values require good interaction between the respiratory, cardiovascular and neuromuscular systems. VO<sub>2</sub>max is indeed connected with an athlete's results, but does not fully explain his or her success. There are other factors which contribute to the athlete's performance, such as body weight, fat percentage, metabolism, and how economical we are in our movement. Therefore, two marathon runners could have same VO<sub>2</sub>max but different success in the race.



YOUR RESULT:

### AVERAGE AEROBIC POTENTIAL

**Analysis of the genes which influence your aerobic potential has revealed that you are the carrier of genetic variants which determine average aerobic capability.**

### Recommendations:

- It is expected that people with low aerobic predisposition will have to work more for the same results compared to you.
- With our genetic test, we evaluated your genetic aerobic potential, while to get an idea of your current aerobic performance the easiest way is to test for your VO<sub>2</sub>max.
- Follow the instructions and try to perform the very simple Queens College Step Test.
- Among activities to increase your VO<sub>2</sub>Max we recommend you start with basic aerobic training, e.g. continuous, low and moderate intensity (60–80% HRmax), lasting between 20–40 minutes, of repetitive, cyclic movements, such as walking, light jogging, cycling, elliptical device or swimming.
- For better results and in order to decrease mechanical stress and to maintain motivation, use a few types of the training options mentioned.
- Start with 3 training sessions a week and gradually increase training volume to 4–5 times a week, provided you are not involved in other types of physical activity.
- After a few weeks, you may start to play with an intensity parameter, mixing a few minutes of harder work (75–85% HRmax) with a few minutes of active recovery (60–75% HRmax).

#### FACT

Indicator of cardiovascular fitness, measured in millilitres of oxygen used in one minute per kilogram of body weight (mL/(kg\*min)).

#### WHAT INCREASES IT?

Regular exercise, healthy diet.

#### WHAT DECREASES IT?

Smoking, iron deficiency, dehydration.

## MEASURE YOUR CURRENT VO<sub>2</sub>max

You can measure your own oxygen capacity by approximating with a field test. The Queens College Step Test is one of many popular variations of step test procedures used to check your current VO<sub>2</sub>max. You only need a roughly 40 cm high step and a (stop) watch.

**Procedure:** step up and down on the platform at a rate of 22 steps per minute (females) and at 24 steps per minute (males). You have to step using a four-step cadence, 'up-up-down-down' for 3 minutes. After 3 minutes, stop immediately and count the number of heart beats for 15 seconds after 5–20 seconds of recovery. Multiplying this 15-second reading by 4 will give you the beats per minute (bpm) value to be used in the calculation below.

**Scoring:** an estimation of VO<sub>2</sub>max can be calculated from the test results, using the formula below:

men:  $VO_2\text{max (ml/kg/min)} = 111.33 - (0.42 \times \text{heart rate (bpm)})$

women:  $VO_2\text{max (ml/kg/min)} = 65.81 - (0.1847 \times \text{heart rate (bpm)})$

### Rank your current aerobic fitness using a VO<sub>2</sub>max norms chart



Age (years)	Superior	Excellent	Good	Fair	Poor
20-29	56+	51-55	46-50	42-45	≤ 41
30-39	54+	48-53	44-47	41-43	≤ 40
40-49	53+	46-52	42-45	38-41	≤ 37
50-59	50+	43-49	38-42	35-37	≤ 34
60-69	46+	39-45	35-38	31-34	≤ 30
70-79	42+	36-41	31-35	28-30	≤ 27

Note that the Queens College Step Test gives you a rough estimation of your VO<sub>2</sub>max. If you have some experience in long and middle-distance running, another alternative for VO<sub>2</sub>max estimation may be a 3000m Cooper Test. Search the web for instructions and norm charts. Advanced athletes can also go for a more precise Laboratory VO<sub>2</sub>max test, which is based on gas analysis and conducted under the supervision of an exercise physiologist.

*In general, women reach about 15–30% lower VO<sub>2</sub>max values compared to men. This is mostly due to differences in our body composition, especially a higher percentage of body fats and lower percentage of muscle mass in women. Namely, if someone has more muscles, this also means a higher capacity for oxygen consumption.*

## POST-EXERCISE RECOVERY

Did you know that physical activity can cause oxidative stress in our body via increased production of Reactive Oxygen Species (ROS)? Besides the production of ROS, exercise can affect the body's complex immune system and produce a cascading effect of inflammatory responses, leading to chronic inflammation.

ROS are constantly generated in our body during various processes of cell metabolism. ROS by themselves are not bad, while increased production of ROS can lead to oxidative damage, which also affect the immune system. This can be the situation during and after physical activity. Namely, during high-intensity training, the uptake of oxygen into active muscles is increased up to 20-fold, while the flow of oxygen in activated muscles can be increased even up to 100-fold. Consequently, large amounts of ROS are formed. Likewise, production of ROS is increased in the case of skeletal muscle injuries. If ROS are formed in amounts that exceed the capacity of our antioxidant defence system, this causes oxidative stress in our body, and when a body becomes chronically inflamed, a host of negative and potentially injurious conditions can result.



YOUR RESULT:

### FASTER RECOVERY AFTER TRAINING

The analysis of the group of genes involved in removal of Reactive Oxygen Species and inflammatory processes has shown that favourable genetic variants prevailed, which means that from a genetic point of view you fall within "faster recovery after training".

### Recommendations:

- Fast recovery after training is good, as this means that your genes determine that your body needs less time to recover.
- However, if you feel you need more time to recover, high-intensity training two days in a row is counterproductive for you. Measure your resting heart rate the next morning and if it's higher than usual, you need another day to recover.
- Zinc eradicates inflammation and can help to improve your muscle mass. Taking zinc as a standalone supplement can cause copper deficiency, so it's preferable to take it in a multivitamin which also contains copper.
- The amount of sleep also affects your recovery; therefore, get enough rest, especially after high-intensity activity.
- Eliminate trans fats for lower inflammation.
- Nevertheless, it is highly recommended to monitor your physical fitness for any signs of chronic overtraining.
- No matter whether you are a professional or recreational athlete, training diary management is the perfect tool for finding an optimal recovery time from a given type of activity.

*Stress causes a temporary decrease in body function, followed by an adaptation that improves function. In order for us to improve our health, fitness or athletic ability, it is necessary to increase our efforts to fatigue-level intensities and then recover and refuel.*

## WARRIOR GENE

Even with years of preparation and training, some people crack under pressure, while others seem to thrive on pressure and adrenaline. The answer lies particularly in the **COMT gene**. Its product is responsible for breaking down adrenaline. Due to the variant within this gene, some people are “warriors” while others are “worriers” in their nature. GG carriers (Warriors) have a highly active COMT enzyme; therefore, adrenaline is broken down fast, resulting in a low baseline level of adrenaline. AA carriers (Worriers), on the other hand, create the COMT enzyme with the lowest activity, which results in a high baseline level of adrenaline. The AG form comes somewhere in the middle.

There is an optimal level of adrenaline for everybody. The worrier is probably already at his/her optimal level, therefore the automatic increase in adrenaline in a challenging situation will push him/her over the edge. Their hands get sweaty, their muscles start shaking, motor skills start to suffer, their brain is working too hard, with incoherent thinking as a result, and they suffer from tunnel vision. Looking at the warrior, whose adrenaline levels are normally low, the same challenging situation will cause an increase in adrenaline up to the optimal level.



YOUR RESULT:

### WARRIOR TYPE

The analysis of the specific variant within the COMT gene has revealed that you are the carrier of the GG genotype, which means you fall within the Warrior type of people.

### Recommendations:

- In normal daily situations, your level of adrenaline is lower, compared to AA carriers, while in challenging situations your level of adrenaline is just at the right level to be effective.
- This gives you an advantage in stressful situations, as your head remains clear and you probably go for more risk-taking decisions in life.
- Most probably, your pain threshold is higher and you have an advantage in attention tasks.
- It should be somewhat easier for you to be successful in achieving your fitness goals, as you don't find the process towards your goals too stressful.

*COMT is decreased by oestrogen, such that overall COMT activity in the prefrontal cortex and other tissue is about 30% lower in females than in males. This diminished COMT activity translates to about 30% higher baseline adrenaline levels in females than in males.*



#### FACT

It was successfully used in a US criminal trial to lower the sentence.

#### WARRIOR

Positive reaction to stress, enjoys risk taking, higher pain threshold.

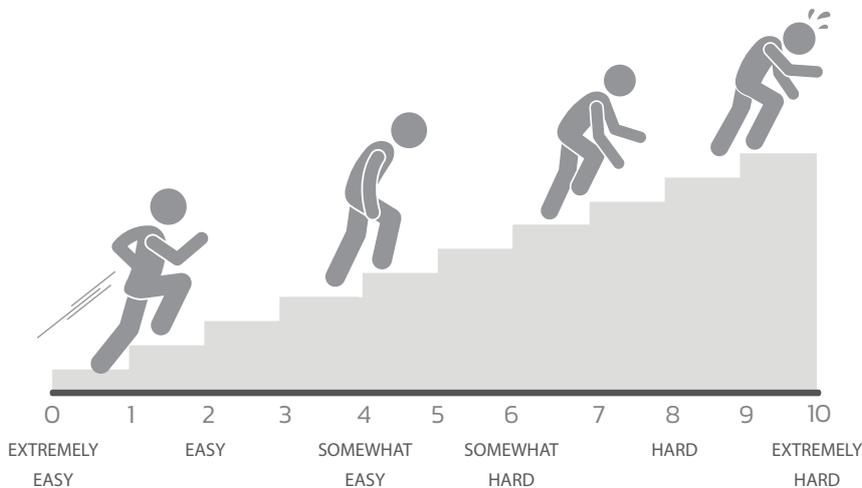
#### WORRIER

Enhanced vulnerability to stress, lower pain threshold, more efficient under most conditions.

# HEART CAPACITY

Our heart pumps **about 5 litres of blood every minute** when we are resting, while during exercise it pumps about **5 times** as much blood as during rest. Our aerobic capacity depends on “central” factors - the ability of the lungs and the heart to bring oxygen to the working muscles, as well as on “peripheral” factors - the ability of those muscles to use the oxygen delivered in the process of producing fuel for a muscle contraction. A good heart condition is therefore an essential element which enables us to take advantage of our overall sports potential.

Regular physical activity is universally accepted as a central component of a heart-healthy lifestyle as it induces beneficial changes in the cardiac function (better heart capacity), which furthermore, importantly affects our aerobic capabilities. For example, a physically active individual can perform the same amount of physical work with less strain on the heart (indexed as lower heart rate and blood pressure during a given work output) than a sedentary person. This is because our heart has to be able to actually transport the necessary amounts of oxygen to our muscle tissues. For example, your heart may not be able to pump enough blood with each beat – and since blood contains oxygen, this limits your oxygen capacity. Good heart capacity is therefore an important independent element of your overall aerobic capacity. In addition to this, better heart capacity is associated with improvements in traditional cardiovascular disease risk factors: lower blood pressure and plasma low-density lipoprotein cholesterol levels (LDL) and increased plasma high-density lipoprotein cholesterol levels (HDL).



*OMNI scale - scale of perceived exertion*

*A reduction in heart rate for a given intensity is usually due to an improvement in fitness but a number of other factors might explain why heart rates can vary for a given intensity: dehydration can increase the heart rate by up to 7.5%, heat and humidity can increase the heart rate by 10 beats/minute, altitude can increase the heart rate by 10 to 20%, even when acclimatised and biological variation can also mean that the heart rate varies from day to day by 2 to 4 beats/minute.*

## FACT

Exercise leads to muscle growth therefore athletes can also have larger hearts.

## WHAT INCREASES IT?

Aerobic exercise, electrolyte balance.

## WHAT DECREASES IT?

Dehydration, lack of exercise, poor diet.



## YOUR RESULT: **HIGHER HEART CAPACITY POTENTIAL**

Our genetic analysis has revealed that your heart capacity genetic potential is higher than the average, as you have genetic variants present which work in a positive way for you.

### Recommendations:

- Different scientific studies have shown that our heart capacity potential determined by our genes is to a certain degree. However, the heart is a muscle and with appropriate exercise it will become larger and become more efficient as a pump.
- Your heart capacity is an important element of your overall aerobic potential. Since your result is favourable, heart capacity shouldn't be a limiting factor in achieving high aerobic capacity.
- However, your genes determine only your potential. It is good to know that the body's ability to transport oxygen to and carbon dioxide away from the working muscles can be developed and improved.
- If you are a beginner, start with any kind of aerobic activity that you think you can persevere with for a few months.
- If you have any orthopaedic problems, like ankle, knee or lower back pain, stick to an elliptical device, roller blades, a stepper or just walking.
- Start with 20-minute sessions 3–4 times a week. A moderate intensity 60–75% HRmax or RPE - 6 (OMNI scale) will be effective enough.
- Gradually increase your workout sessions time to 40 minutes.
- After a few months you will be ready for more advanced aerobic interval training methods.
- It is important to understand that as far as health benefits are your main concern and the cardio-vascular system is your main target organ, moderate intensity and volumes are good enough to reach the goal.



## MUSCLE VOLUME GENE

To determine your potential to increase your muscle size (hypertrophy), we analyse a specific gene, called **IL15RA**, which is involved in the prevention of muscle breakdown, lean body mass and muscle building in response to training. Your result tells you whether you have a genetic variant present associated with muscle size or whether you have the version linked to muscle strength in response to resistance training. It's obvious that some individuals respond much better to a certain type of training than others. Some individuals look more muscular after one year of lifting than most people do after ten, since our progress largely dependent on our genetics.

Studies have shown that IL-15 is an important mediator of muscle mass response to resistance exercise training in humans and that genetic variation in IL15RA accounts for a significant proportion of the variability in this response. Significantly greater increases in total lean mass and arm and leg circumference were observed in those with an A allele. However, muscle strength gain was in the opposite direction, in which the mean relative strength (strength, expressed per kg of your body mass) gain was lower with the addition of each A allele.



### YOUR RESULT:

## LOW MUSCLE VOLUME POTENTIAL

The analysis has shown that your genetic makeup doesn't give you an advantage in terms of muscle volume compared to individuals with one or two A copies of IL15RA present. However, it gives you an advantage in terms of muscle strength and quality gain after training (e.g. relative strength).

### Recommendations:

- The IL15RA gene regulates the bioavailability of the IL-15 protein, a growth factor, expressed in our muscles. IL15RA therefore indirectly affects the size of muscles and their strength.
- The analysis has shown that you are the carrier of two copies of the IL15RA gene, associated with decreased potential for muscle size in response to strength training, while at the same time, you have great potential for muscle strength.
- In terms of muscle size, you are a "hard gainer" and you don't respond well. As a result of resistance training, people with your genetic makeup can expect to benefit from muscle strength and quality, rather than high muscle volume.
- Of course, the rate and amount of adaptation is highly influenced by genetics, but appropriate training methods will always account for a large portion of training effects.

#### FACT

The largest muscle in the body is the gluteus maximus (the large muscle of the buttocks).

#### WHAT INCREASES IT?

Frequency of training, quality of sleep, protein-rich and healthy diet.

#### WHAT DECREASES IT?

Quick-fix diets, low calorie intake, sedentary lifestyle.

### HOW DO WE BECOME STRONGER?

We become stronger as a result of the body's adaptation to a special stimulus, produced by muscle loading during resistance training.

- That stimulus should be greater than we are used to, otherwise the system doesn't feel an urge to adapt. Strength training is all about leaving the comfort zone behind.
- Next, the adaptation is time and type of load dependent. From the TIME perspective, beginners progress pretty fast with weight training since the adaptation is mostly neurological. It means that our inter-muscular and intra-muscular coordination becomes better. Sometimes, these kinds of gains are called "qualitative", because the muscles learn to perform better without getting bigger. Intramuscular coordination refers to the ability of a given muscle to be more engaged in a certain movement. In other words, how effective the coordination is between the muscle fibres of that single muscle. Inter-muscular coordination refers to the ability to coordinate the cooperation, timing and a level of engagement of all the muscles in your body during a certain move or exercise. While some muscles are in charge of moving a limb, others should stabilise the spine or be relaxed enough to permit the movement to happen. Usually, the first 2–3 month of strength training mostly improve this (quality) component.
- When the ability to gain strength, mostly due to a neurological adaptation, starts to diminish, another form of adaptation permits us to keep going with the weights. This is called muscle hypertrophy (check out a corresponding topic for more information). This form of adaptation is called morphological or "quantitative", since it requires new tissue formation: the muscles' cross-sectional area becomes larger and they have more contractile protein content inside. From the type of training perspective, we can adjust the type of preferable adaptation by adjusting the volume, intensity and tempo (time under tension). While high loads and low repetition sets (RM 1–5) target mostly a neurological component of strength, higher reps (RM 6–15) are associated with hypertrophy stimulation, provided all other complementary circumstances are optimal. (Check out our RM chart for more information on this topic).



### HYPERTROPHY AND MUSCLE VOLUME GENE

What factors contribute to a muscle hypertrophy effect due to resistance training? Although genetics have a great influence on muscle development potential, there are a few more evidence-based factors that may contribute to a "muscle-building" process or, if not considered, to slowing down hypertrophy gains:

- **Frequency**  
Frequency of training is crucial. When you lift weights, you cause damage to your muscles. This is often referred to as microtrauma. Microtrauma involves the tearing and shearing of delicate protein structures within your muscle cells. This may sound bad but, in reality, it is necessary for the initiation of growth after your workout. Results have shown that muscle mass increases are greater with three workouts per week, compared to those achieved with one workout per week. In addition, strength increases are on average 40% greater!
- **Nutrition**  
It's essential to meet the needs of the exerciser: calorie intake, building material (proteins), proper hydration, vitamins, minerals and similar.
- **A good sleep**  
While you exercise you don't build up muscle mass, but in fact damage muscles so that later they can recover and become larger and stronger than they were before. To recover and adjust requires calories, protein, carbohydrates and other constituents of the diet. Muscle then grows while we rest and sleep, because some very important muscle-building hormones are released during sleep. Therefore, take special care to ensure a good night's sleep.
- **Focused training type**  
For the hypertrophy-specific training cycle, keep unnecessary high-energy-demanding activities (long-distance running or cycling, boxing, step or aerobics classes) to a minimum, because they tend to be extremely catabolic (the opposite of anabolic) on the one hand and energy depleting on the other.
- **Manage your stress**  
High stress levels may slow down your growth, since stress hormones (like cortisol and adrenaline) that produce a sympathetic background for a long period of time also have a catabolic effect on muscle tissue.

# LEAN BODY MASS

**Lean body mass (LBM)** is a term for your total body weight without the fat. It is also called “fat-free” mass and includes the weight of your muscles, bones, organs and skin. Your lean body mass status determines whether or not you are more likely to have higher body muscle mass and lower fat levels. Optimal lean body mass percentage is 80 to 85 percent of total weight for men and 75 to 80 percent for women.

Lean body mass is strongly influenced by genetics with heritability ranging from 52 to 84 percent. If you are genetically predisposed to have higher lean body mass, you have a better chance of attaining a muscular body through fitness exercises. Having a high lean body mass also has many health benefits far beyond just looking like a swimsuit model. Lean body mass percentage affects your metabolism and energy level and impacts your strength and agility. Higher lean body mass decreases the likelihood of excessive body weight, obesity, impaired protein balance and osteoporosis.



YOUR RESULT:

**HIGHER POTENTIAL**

The analysis has shown that your genetic makeup gives you an advantage for high lean body mass. Approximately 39 percent of people have such a genetic makeup.

## Recommendations:

- You have a better predisposition for a higher lean body mass, what indicates that you have a better chance of attaining a muscular body through fitness exercises than the average population.
- Having a genetic predisposition for a higher lean body mass is good because muscles are metabolically active and increase your metabolic rate, making it easier to maintain an overall healthy weight.
- Make sure to consume enough proteins. Good sources of proteins include eggs, low-fat dairy, lean steak, white-meat poultry and fish. An egg, for example, contains 12 g of protein and 100 g of chicken breast contains 15.8 g of protein.
- Staying properly hydrated is critical to building muscle. By drinking enough water before, during, and after your workouts, you can significantly increase your performance.

### FACT

It is the most accurate factor for prescribing proper levels of medications, as body fat is less relevant for metabolism.

### WHAT INCREASES IT?

A combination of strength and cardio training, protein-rich diet, vitamin D.

### WHAT DECREASES IT?

Quick fix diets, low calorie intake, sedentary lifestyle.

*Building muscles requires getting an adequate amount of sleep each night—ideally at least seven to eight hours. During sleep, our bodies release growth hormone and testosterone, which allow the muscles to recover and grow following a hard workout. Without sufficient sleep, your efforts to build muscle will be severely compromised.*

# GENE FOR MUSCLE FATIGUE

Muscle fatigue can be one of the main obstacles which can prevent athletes from achieving their maximum potential. During exercise, contracting muscles produce lactate and hydrogen ions as a result of a process called glycolysis. Small amounts of lactate operate as a temporary energy source. However, accumulation of lactate during high-intensity exercise can create a burning sensation in muscles and limits muscle contraction, resulting in muscle fatigue. Thus, our body has a system to transport lactate out of muscle cells.

A molecule called monocarboxylate transporter 1 (MCT1) is responsible for the export of lactate across the muscle cell membrane. Specific mutation within the MCT1 gene influences the amount of MCT1 transporters produced and, in this way, affects the rate at which lactate is cleared out of our muscle cells. And this can further influence how quickly someone feels fatigue and can also impact recovery time after a workout.



## YOUR RESULT: SLIGHTLY LESS EFFICIENT LACTATE REMOVAL

You are the carrier of one favourable and one unfavourable copy of the MCT1, which determines a slightly slower removal of lactate from muscle cells. Approximately 38 percent of people in the population have such variant of the MCT1 gene.

### Recommendations:

- You fall within the group of AT carriers, who have been shown to have, in comparison to AA carriers, a slightly decreased amount of MCT1 transporters in muscle cells. In studies, this was associated with a slightly higher degree of muscle soreness and fatigue.
- We advise you to keep hydrated and at the same time ensure sufficient intake of electrolytes. It will help you to maintain fluid balance and delay fatigue.
- The most common electrolytes are potassium, calcium, magnesium, sodium and phosphate.
- Omega-3 fatty acids are among the nutrients that help to increase lactate clearance and thus reduce your muscle fatigue.
- Also, deficiency of B vitamins negatively influences your muscle fatigue. Even a mild deficiency in B vitamins can decrease your body's ability to regenerate after exercise.
- Green leafy vegetables like spinach, as well as eggs, milk, yogurt, brown rice, liver and beef, are all good sources of a range of B vitamins.

#### FACT

It plays a big role in limiting performance in just about every individual in every sport.

#### WHAT INCREASES IT?

Dehydration, alcohol, poor diet.

#### WHAT DECREASES IT?

Electrolyte balance (especially magnesium), omega-3 fatty acid, B vitamins.

*Researchers have found that beside muscle cells, brains cells can also use lactate as a fuel. It's actually lactate that keeps your brain working during prolonged aerobic exercise (like marathons) when blood sugar is exhausted.*

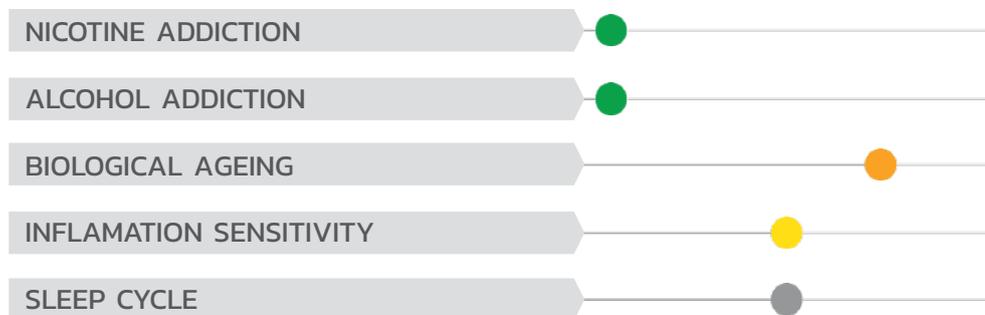


# GENETICALLY DETERMINED ADDICTIONS AND LIFESTYLE

## YOU CAN INFLUENCE ADDICTION AND LIFESTYLE

In this chapter, you will learn about how susceptible you are to nicotine and alcohol addiction. We will also reveal your sleep cycle and rate of ageing in comparison to the average population, and whether your genetic makeup determines that a change of lifestyle is important for you.

What is a lifestyle, anyway? Lifestyle is a concept which was established back in 1929 by an Austrian psychologist Alfred Adler. With this concept, we describe our way of life or our habits. It is generally known that smoking, alcohol drinking, inappropriate diet and lack of physical activity point to an unhealthy lifestyle and are the cause of many health problems. If we are prone to nicotine or alcohol addiction, it is highly recommended to preventively avoid such habits, as the possibility of addiction is higher. Excessive alcohol drinking and cigarette smoke additionally influence our ageing process, and, if you have unfavourable genes which determine a higher rate of ageing, we recommend limiting alcohol and giving up smoking.



# NICOTINE ADDICTION

**Smoking** is proven to be the cause of countless serious medical conditions, which can also be related to a premature death. It is enough to mention that every tenth person (or half of the regular smokers in the world) dies because of the consequences of smoking. Despite this fact, smoking remains a habit that very few people give up. World Health Organisation estimates that a year after having their last cigarette, less than 5 percent of people who have quit smoking without help remain non-smokers.

Smoking causes psychological addiction, and nicotine is the compound responsible for it. It binds special receptors in the brain, and it causes a feeling of comfort and pleasure. These receptors differ slightly among people, and the mentioned binding is not the same for all people. This is why some people are more addicted to nicotine and some less. Researchers have discovered that a mutation in the *CHRNA3* gene does not influence the beginning of smoking, but it influences the number of cigarettes smoked and causes a greater addiction to nicotine. This is why people with a mutated *CHRNA3* gene find it harder to stop smoking.



YOUR RESULT:

## LOWER RISK FOR ADDICTION

You are the carrier of two favourable copies of the *CHRNA3* gene, which determines a lower risk for nicotine addiction. Approximately 38 percent of people have such a genetic makeup.

### Recommendations:

- If you do not smoke, there is a smaller chance that you become addicted to nicotine, but this is not a reason to experiment with smoking.
- If you smoke, you can give up smoking much more easily than people with a less favourable genetic makeup. Therefore, do not waste time and start following our recommendations.
- Do not console yourself by saying that one cigarette does no harm. Among other things, smoking has an unfavourable effect on HDL cholesterol level and on an increase of the formation of free radicals. When there are too many free radicals in your body, they attack healthy cells and damage them.
- Smoke cigarettes in a way that is unpleasant to you. If you normally drink coffee when smoking, try to leave it out.
- Go out for some fresh air as often as possible, and linger in places where smoking is forbidden.
- Those who have successfully given up this habit should serve as an example and give you additional motivation in your own process of giving up.

#### FUN FACT

Nicotine is highly addictive, and it is one of the most commonly abused drugs.

#### HEALTH IMPACT

Nicotine withdrawal symptoms include stress, anxiety, irritability, difficulty concentrating, and sleep disturbances.

#### SOURCES

Tobacco plant.

*Some smokers continue smoking because they are afraid that they will gain weight if they quit smoking. The weight of smokers on average is as much as 4–5 kg lower than that of non-smokers. It is true that the majority of people gain weight in the first year after they quit smoking, but most often only to the average of non-smokers.*

# ALCOHOL ADDICTION

**Alcohol addiction** is a serious health problem, and, at the same time, a well-studied area for which genetic material is well-known to have an influence. Alcohol addiction is expressed in behavioural and psychological problems. An individual continues to turn to alcohol, even though it is starting to visibly affect his physical and mental health. On the basis of a lot of research, we can say that our genetic makeup determines approximately 65 percent of our tendency for alcohol addiction. This research is based mainly on studies of twins and numerous family studies, where it turned out that the tendency for alcohol addiction is passed down from generation to generation. On a molecular level, the basics of alcohol addiction are extremely complicated, because the occurrence is influenced by several genes, where every gene has a slight influence. We have included in your analysis the genes which have been proven by many studies to have a strong influence on alcohol addiction.



YOUR RESULT:

## LOWER RISK FOR ADDICTION

You have favourable genes present which determine a lower risk for alcohol addiction.

### Recommendations:

- Your genetic makeup is one of the most favourable ones as it determines a lower risk for alcohol addiction.
- However, this does not mean that your genes entirely protect you against alcohol addiction. What is most important is your will and determination not to drink alcohol excessively.
- Your social surroundings also have an important role. It is vital that you are aware of the consequences of excessive alcohol drinking, and you do not succumb to situations which would lead you to alcohol addiction.
- Drinking small amounts of alcohol (1dl of red wine) can be beneficial for your health because it affects the increase of HDL cholesterol in the blood. However, be careful and do not overdo the amount of alcohol you drink.

*In Europe, alcohol is the third leading cause of premature death and overall mortality. According to recent data from the World Health Organization, if we calculate the pure alcohol consumption per person aged over 15 years, Moldovans and Czechs drink the most.*



#### FACT

Alcohol consumption is highest in Western Europe and Australia, and lowest across North Africa and the Middle East.

#### HEALTH IMPACT

Drinking more than 1 drink per day increases the risk of heart disease, high blood pressure, and stroke.

#### SOURCES

Alcoholic drinks (beer, cider, wine, whisky, vodka, etc.).

## BIOLOGICAL AGEING

We differentiate two types of ageing, chronological and biological. In a chronological sense, we are as old as our years of age, while biological ageing is the ageing of our body. It is about determining whether our body looks according to its age. For example, when saying to a 70-year old that we would never think him to be that old, we actually say that from a biological standpoint this person looks younger.

The molecular cause for ageing is in the length of a structure called telomeres. They are the endings of our chromosomes, consisting of a repetitive DNA sequence (TTAGGG). In the course of our lives, these telomeres become shorter, and this causes us to age. The rate of the shortening of telomeres depends on numerous environmental factors, as well as on the variant of the **TERC gene**. It has turned out that a mutation in the DNA sequence can occur. This manifests in shorter telomeres and, on average, a 3–4 years higher biological age of an individual with a mutated copy of the gene.



YOUR RESULT:

### FASTER AGEING

**You are the carrier of one favourable and one unfavourable copy of the TERC gene. Such a genetic makeup is related to faster biological ageing and is present in approximately 40 percent of all people in the Caucasian population.**

### Recommendations:

- Compared to people with two unfavourable copies of the TERC gene, you age slightly slower. However, you age slightly faster compared to people with two favourable copies of the TERC gene.
- The ageing process is not determined only by the genes, as the actual state depends also on various environmental factors and bad habits.
- We recommend that on summer afternoons you do not expose yourself to the sun, because the radiation that accelerates ageing is the most powerful at that time.
- Try to use sunscreen with a higher SPF regularly.
- Give yourself enough time for sleep, because sleep deprivation leads to faster ageing.
- Courgettes contain plenty of beta-carotene, which slows down biological ageing and has anticarcinogenic effects, and they should, therefore, be on your menu often.

#### FACT

The oldest human was Jeanne Calment with a lifespan of 122 years and 164 days.

#### WHAT INCREASES IT?

Smoking, excessive stress, overeating and poor diet (sugar, saturated and trans fats, alcohol).

#### WHAT DECREASES IT?

Mediterranean diet, exercise, adequate sleep, avoiding stress.

*Did you know that on average women live longer than men? Women have an advantage because of the hormone estradiol, which is a physiological antioxidant and acts as natural protection. In men, testosterone does not have this protective function; therefore, they are more susceptible to harmful elements from the environment.*

# INFLAMMATION SENSITIVITY

Inflammatory response is a vital part of the body's immune response. However, short-term and long-term inflammation should be distinguished. Short-term acute inflammation is a normal process in our body to recover after an injury or illness. It also occurs during recovery after exercise and influences muscle development.

On the other hand, prolonged short-term acute inflammation can lead to long-term chronic inflammation and this can further result in cardiovascular complications and some chronic diseases of modern society such as heart disease, atherosclerosis, diabetes, high blood pressure and asthma. Environmental factors that can contribute to the level of inflammation are lack of sleep, excessive stress and poor nutritional choices. Besides, genetics also play an important part in the level of inflammation. The most studied genes in this context are the **IL6, TNF, CRP** and **IL6R genes**, which all encode for the inflammatory molecules and are as such strongly involved in the regulation of inflammation.



## YOUR RESULT: AVERAGE SENSITIVITY TO INFLAMMATION

You are the carrier of such genetic variants which determine average sensitivity to inflammation.

### Recommendations:

- Your genetic predisposition shows an average inflammatory response.
- Protect yourself against inflammation by including sufficient amounts of antioxidants and other anti-inflammatory nutrients in your diet. For example, dark green vegetables, beetroot, dark chocolate, red pepper, walnuts, ginger or salmon.
- Food rich in fibre also has an anti-inflammatory effect. Optimally, you should be consuming about 25 grams of fibre on a daily basis. Nuts, peas, beans and lentils are all good sources of fibre.
- Include foods rich in omega-3 which help to reduce inflammation and also help to promote recovery after training.



#### FACT

Chronic inflammation is linked to most chronic diseases including arthritis, cardiovascular diseases, and diabetes.

#### WHAT INCREASES IT?

Lack of sleep, stress and poor diet (sugar, saturated and trans fats, alcohol).

#### WHAT DECREASES IT?

Omega-3 rich food, berries, green leafy vegetables, nuts and seeds.

*The word inflammation comes from the Latin word inflammare (meaning "to set on fire").*

## SLEEP CYCLE

Do you like to wake up early in the morning or is it in the evening that you work best? Your favourite part of the day also depends on your unique circadian rhythm, often called the “body clock”. Circadian rhythm is the 24-hour internal clock that is running in your brain and tells your body when to sleep, get up, eat and even regulates your body’s temperature and level of hormones.

Understanding your body’s internal clock is the first step towards better sleep and well-being. At the same time, it can help you to adjust day-to-day activities so that your results are optimal. The preference for being a “morning person” who enjoys waking up early or an “evening person” who likes to stay up late at night is partially written in your genes. The CLOCK and NPAS2 genes have been reported to affect the sleep cycle and can reveal your natural sleeping patterns. You can fall into one of these three results: “morning type”, “intermediate type” or “evening type”.



YOUR RESULT:

### MORNING TYPE

**Our genetic analysis has shown that you are a carrier of genetic variants that indicate you are a morning person.**

### Recommendations:

- Individuals with such genotype tend to feel sleepy earlier in the evening, wake up early in the morning and have shorter sleep duration.
- It has been shown that people with the same genetic result as you are less likely to experience daytime fatigue and are less likely to experience sleep deprivation due to their genetic makeup.
- It is also expected that you are less likely to require more than 8 hours of sleep per day.
- One study has revealed that morning people reach peak performance 5.4 hours after waking. At this time, you should perform the most difficult mental or physical activities.

#### FACT

Adults need from 7 to 9 hours of sleep per day.

#### WHAT INCREASES IT?

Daily exercise, regular sleep schedule, relaxing bedtime ritual.

#### WHAT DECREASES IT?

Avoid caffeine, alcohol and eating before sleep, napping during the day.

*Scientists estimate that only about 5 percent of people are natural “short sleepers” who feel well rested after six hours of sleep or less. Are you among them?*

## SLEEP CYCLE AND APPETITE REGULATION



Lack of sleep and disruption of our internal clock may influence many body functions, especially metabolism. That can result in several metabolic and endocrine alterations, including decreased glucose tolerance, decreased insulin sensitivity, increased evening concentrations of cortisol and increased hunger and appetite. Lack of sleep has also been associated with increased incidence of obesity, hypertension, and other metabolic disorders.

Several studies showed an association between short sleep and higher BMI. In studies that restrict sleep, people consume more calories, particularly from snacks.

Better sleep might help people feel less hungry or have more willpower to stick to healthy choices.



## HOW CAN I GET A BETTER NIGHT'S SLEEP AND BE HEALTHIER?

By using the following tips, you can enjoy better sleep at night and improve how you feel during the day:

- **Keep a regular sleep-wake schedule:** Choose a bed time when you normally feel tired, try to go to sleep and get up at the same time every day. Whether it's 11pm to 7am or 2am to 10pm, always sleep on a consistent schedule. You will feel much more refreshed and energized than if you sleep the same number of hours at different times.
- **Nap smart:** Napping is a good way to make up for lost sleep. However, limit naps to 15 to 20 minutes in the early afternoon.
- **Find a career that suits your clock:** Working a 9 to 5 may not be the best idea for an evening type person. If you are able, choose a job that falls more in line with your natural circadian rhythm.
- **Avoid unhealthy snacks:** People who go to bed after 11pm are far more likely to indulge in unhealthy foods than those who go to sleep early (between 7pm and 11pm). Evening types are also more likely to indulge in unhealthy snacks before going to bed, taking in an average 220 more calories each day.

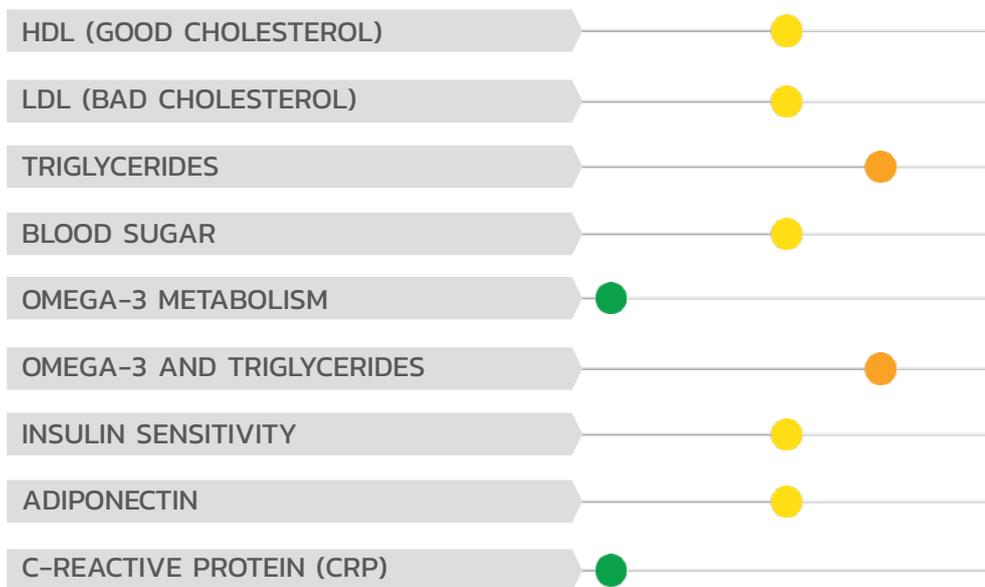


# CARDIOVASCULAR HEALTH

## WITH AN APPROPRIATE DIET YOU CAN PREVENT NUMEROUS HEALTH COMPLICATIONS

In this chapter, you will learn what levels of LDL and HDL cholesterol, triglycerides and blood sugar are determined by your genes. You will also learn how effective your metabolism of omega-3 fatty acids is, what is your tendency to high triglyceride levels and how efficiently your body regulates the level of insulin. In the case of unfavourable genes, it is really important to adjust your diet appropriately and achieve better health. Knowing your genetic predispositions to these and following the recommendations can lead you to better cardiovascular health.

Cholesterol is a substance which is normally produced by our body, and it is also found in food. We differentiate good HDL cholesterol and bad LDL cholesterol. In addition to cholesterol, our health is also influenced by blood sugar level, which has to be as low as possible, and triglycerides, which, if increased, have the same effect as bad LDL cholesterol. Inappropriate levels of any of these components can quickly cause cardiovascular complications, increased blood pressure, obesity and diabetes. This is, in a way, prevented by complex body mechanisms which are fighting against the external influences (the influence of diet, smoking, alcohol, etc.) and are trying to maintain their optimal level. How good they are at this, mostly depends on our genes. Therefore, people with unfavourable genes have to be so much more careful about their diet and lifestyle.



## HDL (GOOD) CHOLESTEROL

**HDL cholesterol**, also known as good cholesterol, is beneficial because it reduces the levels of LDL cholesterol and protects against cardiovascular disease. The HDL particles carry cholesterol from the veins towards the liver, where it is excreted from the body. This is the reason why high levels of HDL cholesterol are an important health factor. While it is true that we risk cardiovascular disease if our HDL cholesterol level drops below 1mmol/l, the HDL level between 1 and 1.5 mmol/l is determined as average (normal). However, a level, higher than 1.5 mmol/l, already protects us from cardiovascular disease. Therefore, the more HDL cholesterol we have, the better it is for our health. In addition to diet and lifestyle, HDL cholesterol level is influenced also by our genes. We analysed the genes with the greatest impact on HDL cholesterol. In this way, we can effectively determine the level of HDL cholesterol that is determined by your genes.



YOUR RESULT:

**AVERAGE LEVEL**

Your genes determine an average HDL cholesterol level since you have about the same number of favourable and unfavourable variants of genes.

### Recommendations:

- We recommend consumption of seafood, especially prawns, squid, shrimps and mussels. They contain a lot of unsaturated fats, which have been proven to increase HDL cholesterol level. A good alternative to seafood is onion, which can be added to various foods.
- Your HDL cholesterol level is also influenced by body weight. If you are too heavy, start fighting against excess weight with physical exercise.
- You will also contribute to an increase in HDL cholesterol level by giving up smoking. If you do not smoke, avoid passive smoking, as it also reduces HDL cholesterol level.

*Did you know that men, in comparison to women, have a lower HDL (good) cholesterol level? About one third of men and one fifth of women have HDL cholesterol levels lower than 1 mmol/l, which is far below the recommended level of HDL cholesterol.*



#### FACT

Also called good or beneficial cholesterol.

#### OPTIMAL SERUM LEVEL

As high as possible (above 1 mmol/l).

#### HEALTH IMPACT

Inhibits LDL oxidation and eliminates it from arteries.

#### WHAT DECREASES IT?

Consumption of trans fats, lack of exercise, stress, smoking.

## LDL (BAD) CHOLESTEROL

**LDL cholesterol**, also known as bad cholesterol, is one of the two best-known cholesterol types. It is called bad cholesterol because of the fact that too much LDL cholesterol is harmful to our health. It slowly accumulates in the inner walls of the arteries which supply the heart and the brain, and forms thickenings which narrow the arteries and make them less flexible. This phenomenon is called atherosclerosis. When the state does not improve for a longer time, a clot forms and prevents the blood flow in the artery, which can lead to a heart attack or a stroke.

An optimal LDL cholesterol level is below the value 3 mmol/l, which can be measured with a blood analysis. In addition to diet and lifestyle, your genetic makeup also importantly influences the LDL cholesterol level. In our analysis, we have included the genes which are most closely connected to the regulation of LDL cholesterol and have a great influence on it. The combination of all the analysed genes gives reliable information about the level of LDL cholesterol determined by your genes.



YOUR RESULT:

**AVERAGE LEVEL**

The genetic analysis has revealed that that you have favourable, as well as unfavourable variants of genes, and this determines an average LDL cholesterol level.

### Recommendations:

- An excellent preventive measure is to limit the intake of foods which contain trans fats (they are formed when processing oils at high temperatures): margarine, fast food, fried food, roasted nuts, mayonnaise, pastry and cakes.
- Pay attention to foods which contain cholesterol. Limit it to 300 mg per day, which is approximately an egg and a half. We suggest you remove the yolks – egg white does not contain cholesterol).
- We recommend that you add more garlic and onions to your food: preparations from garlic and onions have been proven to reduce LDL cholesterol level.
- Try to eat food rich in fibre, which will favourably influence LDL cholesterol level. You will find enough fibre in whole wheat pasta and bread, plums and pears.



#### FACT

Also called bad cholesterol.

#### OPTIMAL SERUM LEVEL

As low as possible (below 3 mmol/l).

#### HEALTH IMPACT

Hardening of the arteries, interrupted blood flow, clogging of the arteries, heart attack, stroke.

#### WHAT INCREASES IT?

Fatty foods, high-calorie intake, lack of exercise, stress, smoking, alcohol.

*Our level of LDL cholesterol is significantly affected by the hormone melatonin, produced in the skin. It is formed exclusively at night; therefore, sufficient sleep can help reduce your LDL cholesterol. Some melatonin is also present in mustard seeds, almonds and sunflower seeds.*

# TRIGLYCERIDES

**Triglycerides** are actually a type of fat where our body stores energy. They are the most common fats in our body, and their level can quickly become too high. An acceptable level of triglycerides in the blood is less than 1.7 mmol/l, but it is often exceeded. The most common cause for this is a combination of unfavourable genes, an unhealthy diet, and an inappropriate lifestyle. People with a high triglyceride level (this condition is called hypertriglyceridaemia) have an increased risk of heart attack, and this is why it is crucial for our health to keep the triglyceride level as low as possible.

In the following analysis, you will learn the level of triglycerides determined by your genes. The most favourable genes encode a 70 percent lower triglyceride level, whereas the least favourable genes determine a 60 percent higher triglyceride level. It is crucial for carriers of less favourable genes to try to follow our recommendations.



YOUR RESULT:

**HIGHER LEVEL**

Your genes are mostly unfavourable and determine a higher triglyceride level.

## Recommendations:

- Try to limit your daily calorie intake to a recommended value. As much as it is the key to losing body weight, it is also the key to decreasing the triglyceride level.
- Eat mostly food from the group of complex carbohydrates and unsaturated fats, which help reduce the triglyceride level: different vegetables, legumes and nuts.
- Add garlic to your diet, as seasoning for your food. It contains allicin, which helps reduce the triglyceride level.
- We recommend regular physical activity because it represents a strong factor which helps reduce the triglyceride level.

### FACT

Main constituents of body fat in humans and other animals, as well as vegetable fat.

### OPTIMAL SERUM LEVEL

As low as possible (below 1.7 mmol/l).

### HEALTH IMPACT

Atherosclerosis, higher risk of heart disease and stroke.

### WHAT INCREASES IT?

Sugar (specifically fructose), animal fat, lack of exercise, stress, smoking, alcohol.

*Why is it harder to lose fat stores than muscle mass? Proteins that make up our muscles have a fifty percent lower energy level than triglycerides. Practically speaking, this means that triglycerides are twice as light. Therefore, more effort is needed to lower triglyceride levels and lose weight at the expense of excess fat tissue.*

# BLOOD SUGAR

After we consume carbohydrates, which are the most important source of energy, our body breaks them down into simple sugars, which are then absorbed into the bloodstream. The blood sugar level rises and special mechanisms have to make sure that it quickly drops to a basic level. In some people, this regulation is not adequate, and the blood sugar level drops to a basic level much slower, or it stays permanently increased. A certain influence, apart from diet, is also assigned to our genetic makeup. In various studies, scientists have identified the responsible genes, and now, with their analysis, we can determine whether you have to pay more attention to your diet because of the unfavourable variants of these genes. Certain mutations can occur in these genes, which influence the processes of blood sugar regulation, and these deficiencies can lead to a permanent increase in blood sugar. In our analysis, we have included the most reliable genes which have a great influence, and which represent an efficient tool for predicting your blood sugar level, determined by your genes.



YOUR RESULT:

## AVERAGE LEVEL

**Your genes determine an average blood sugar level, which is on the verge of favourable and unfavourable. You have variants of genes present which determine an increase in blood sugar, as well as those that reduce blood sugar.**

### Recommendations:

- We recommend that you put foods on your menu which contain more zinc since it helps to regulate blood sugar. We recommend, for example, tuna, low-fat cheese, whole wheat bread or unmilled rice.
- Try preparing tea out of bean husks, because it has antidiabetic properties (it protects against the increase of blood sugar).
- You can also reduce your blood sugar by adding less white sugar to your food (coffee, doughnuts, and biscuits). It is even better to stop adding sugar altogether.
- Use lemon juice regularly, because citric acid in lemons reduces blood sugar level.

#### FACT

In 2015 almost 34% of US adults had prediabetes (elevated blood sugar levels).

#### OPTIMAL SERUM LEVEL

Between 4.4 and 6.1 mmol/l.

#### HEALTH IMPACT

Atherosclerosis, heart attack, stroke, weakened immune system.

#### WHAT INCREASES IT?

Obesity, added sugars, lack of exercise, stress, high blood pressure.

*Did you know that glucose is the sole source of energy for the brain and that our brain cannot store it? A decrease in blood sugar level is thereby as unfavourable as a sudden increase. When your ability to concentrate decreases, it is very likely a sign that the blood glucose level has begun to drop.*

# OMEGA-3 METABOLISM

**Omega-3** fatty acids are probably among the most known nutrients. They belong to the group of polyunsaturated fatty acids and are important for the proper functioning of the cardiovascular system and the brain. Studies have shown that sufficient daily intake of omega-3 can help towards lowering our blood pressure and level of triglycerides. Numerous members of the omega-3 family known, among which EPA (eicosapentaenoic acid), DHA (docosahexaenoic acid) and ALA ( $\alpha$ -linolenic acid) are the most important. Adequate consumption of ALA is usually not problematic, since ALA is found in many plant seeds and their oils. On the other hand, adequate consumption of EPA and DHA is trickier as they are mostly present only in seafood (fatty fish, algae). To compensate this, our body has the ability to convert ALA into EPA and DHA. However, carriers of T copy of FADS1 gene cannot rely on this due to the poor activity of the FADS1 enzyme, which is responsible for ALA to EPA & DHA conversion.

Recent studies have shown that a specific mutation in the FADS1 gene affects enzyme activity, which results in poor efficiency of the conversion described. Individuals carrying the T variant of the FADS1 gene are therefore at greater risk of EPA and DHA deficiency.



YOUR RESULT:

## EFFECTIVE METABOLISM

**Analysis of your DNA has shown that you are a carrier of two C copies of the FADS1 gene, which determines effective metabolism of omega-3 fatty acids. About 45 percent of the population worldwide has such genotype.**

### Recommendations:

- We recommend that you choose diverse foods, including various sources of all types of omega-3 fatty acids.
- These can include linseeds, walnuts and hazelnuts, which are rich in ALA omega-3 fatty acids.
- If you prefer fish on your menu, mackerel, salmon or tuna are the best sources when speaking about EPA and DHA omega-3 fatty acids content.

#### FACT

Source of energy, growth, development, functioning of the cardiovascular and nervous system.

#### OPTIMAL SERUM LEVEL

Not yet established.

#### HEALTH IMPACT

Reduces LDL and triglycerides and increases HDL levels, lowers the risk of cardiovascular disease.

#### SOURCES

Fatty fish (salmon, tuna, sardines), oils, nuts and seeds (walnut, sunflower, flaxseeds, soybeans).

*Did you know that omega-3 fatty acids are not beneficial only for our health but also represent a secret weapon for muscle growth? They reduce breakdown of proteins and inflammation, which leads to better recovery after the training.*

## OMEGA-3 AND TRIGLYCERIDES

Elevated blood triglycerides represent an important risk factor for the development of cardiovascular diseases, therefore it is important to keep their level low. Omega-3 fatty acids are among the nutrients which can positively contribute to this. However, this effect greatly depends on the **FADS1 gene**. In a recent study, a 1.8g daily intake of omega-3 reduced triglycerides level on average by about 20 percent in individuals with at least one T copy of the FADS1 gene. On the other hand, this lowering effect was only about 3 percent in people with two C copies of the FADS1 gene. Therefore, carriers of two C copies of the FADS1 gene should, in case of a high triglycerides level, focus on different strategies to lower their triglyceride level.



### YOUR RESULT: **OMEGA-3 ARE LESS EFFICIENT IN LOWERING TRIGLYCERIDES**

Analysis of your DNA has shown that you are a carrier of two C copies of the FADS1 gene, which determines that additional intake of omega-3 most probably does not significantly help in decreasing triglycerides.

### Recommendations:

- Your genes determine that increased omega-3 intake would have less influence on lowering blood triglycerides.
- However, this doesn't mean that omega-3 fatty acids don't have an overall positive effect on your body, therefore omega-3 should remain important part of your diet.
- Foods such as fish, seeds and nuts should be regularly on your menu.
- In case of increased triglycerides, it's very important for you to limit your intake of simple sugars (sweets, bakery products).
- Regular physical activity helps to maintain a proper level of blood triglycerides and our overall health; therefore, you should always find some time for at least regular walks.

*Omega-3 helps our body to release the hormone melatonin, involved in the sleeping process. Therefore, among all the positive effects omega-3 fatty acids have, they can also positively affect your sleep. It is said that with sufficient intake of omega-3 you can expect to wake up less during the night and sleep longer. So, another reason to pay attention to the proper intake of omega-3.*

#### FACT

Triglycerides are a main constituent of body fat in humans and other animals.

#### OPTIMAL SERUM LEVEL

Triglycerides below 1.7 mmol/l.

#### HEALTH IMPACT

Atherosclerosis, higher risk of heart disease and stroke.

#### WHAT DECREASES IT?

Omega-3 intake, low carbohydrates (specifically fructose) and fat intake.

# INSULIN SENSITIVITY

**Insulin** is a hormone responsible for decreasing our blood sugar after each meal. Individuals with low insulin sensitivity need more insulin to lower their blood sugar levels as their system is less efficient. Their body simply compensates for this by producing more insulin in order to keep blood sugar stable. However, high insulin production is not so favourable and is associated with a variety of health complications, such as damage to blood vessels, type 2 diabetes, high blood pressure and heart disease. This makes insulin sensitivity and insulin blood level a valuable marker of our health.

In addition to various lifestyle factors, our genetic background plays an important role in insulin sensitivity. It has been proven that specific genes may protect us from decreased insulin sensitivity. For instance, a recent study has shown that individuals with two protective variants of the **PCSK1 gene** have 60 percent higher insulin sensitivity in comparison to those with two common copies of the PCSK1 gene.



YOUR RESULT:

## AVERAGE INSULIN SENSITIVITY

The analysis of your genes has shown that your genetic makeup determines an average insulin sensitivity. About 85 percent of the population have such genetic predisposition.

### Recommendations:

- Besides your genetic makeup, insulin sensitivity depends on many other factors.
- Excess body weight reduces insulin sensitivity and increases the risk of diabetes. If your BMI is higher than 25, you should consider losing some kilograms.
- Include foods rich in fibre especially those with soluble fibre, such as legumes, oatmeal, flaxseeds, Brussels sprouts and oranges. Soluble fibre can help to lower cholesterol, reduce appetite and increase insulin sensitivity.
- Add cinnamon to your tea, milk or yogurt. It has been shown that ½ to 3 teaspoons of cinnamon per day reduces short- and long-term blood sugar levels.

#### FACT

More than 8.5% of people globally suffer from diabetes.

#### OPTIMAL SERUM LEVEL

Between 57 and 79 pmol/l.

#### HEALTH IMPACT

Damage to blood vessels, type 2 diabetes, high blood pressure and heart disease.

#### WHAT INCREASES IT?

Healthy BMI, foods rich in soluble fibre, spices (cinnamon, turmeric, ginger, garlic).

*In history, diabetic patients received insulin extracted from the pancreas of cattle and pigs. Fortunately, genetic engineering and the development of new technologies has enabled pharmaceutical companies to produce human insulin using laboratory cell cultures nowadays.*

# ADIPONECTIN

**Adiponectin** is a hormone which regulates a number of metabolic processes. It reduces our appetite, enhances the ability of muscles to use carbohydrates for energy, and increases the rate at which our body breaks down fats. Through these processes, it promotes energy consumption. High adiponectin level is linked to higher HDL and lower triglycerides & LDL blood levels. Therefore, high blood adiponectin is widely accepted as a general protective marker against type 2 diabetes, obesity, atherosclerosis and some other cardiovascular diseases.

Studies have shown that there is a strong genetic factor that influences adiponectin blood level. The most studied gene in this context is the ADIPOQ gene. A rare variant of the **ADIPOQ gene** works towards increased production of adiponectin hormone, and it has been shown that people with one or two rarer variants of this gene regulate triglyceride level more efficiently.



YOUR RESULT:

## AVERAGE ADIPONECTIN LEVEL

You are a carrier of two common copies of the ADIPOQ gene, which determines average adiponectin production.

### Recommendations:

- Genetic analysis of your DNA has shown that your ADIPOQ gene determines average adiponectin production.
- However, it's important to know that adiponectin is only one of the factors in the overall story.
- Therefore, don't forget that environmental factors also play an important role in adiponectin production.
- Keeping your BMI under 25 units should be one of the most important long-term goals.
- Studies have reported that components of sweet potato increase levels of adiponectin and improve fatty acids oxidation. Sweet potato baked in the oven can be a delicious side dish in combination with meat or vegetables.

*Adiponectin is much higher in people with normal body weight than in obese individuals, which might sound surprising as adiponectin is produced exclusively in fat tissue. The reason simply lies in the fact that stimuli for its production originate from various addresses, which send the signals to the fat tissue and affect production.*

#### FACT

Studies have found that adiponectin is inversely correlated with BMI.

#### OPTIMAL SERUM LEVEL

Approximately 0.01% of all plasma protein.

#### HEALTH IMPACT

It modulates several metabolic processes, including glucose regulation and fatty acid oxidation.

#### WHAT INCREASES IT?

Pumpkin seeds, sweet potato, up to 2 cups of coffee a day.

# C-REACTIVE PROTEIN (CRP)

**C-reactive protein (CRP)** is a protein whose production is elevated in response to various inflammation processes. For instance, infection causes inflammation processes in our body, which further triggers CRP production. CRP is also a good predictor of our cardiovascular health, since cardiovascular diseases are mainly caused by inflammation. Studies have proven that small and constant elevation of CRP is associated with the risk of cardiovascular diseases (CVDs) including heart attack. If this is the case (small and constant elevation of CRP), you may feel completely fine, but low-grade inflammation may lead to problems which become evident only years later.

Other factors which influence the level of CRP are for instance obesity, level of physical activity, stress, sufficient intake of some micronutrients and our genetic makeup. One of the most studied genes in this context is the CRP gene for which it has been proven that each copy of allele T allele decreases the blood level of CRP by approximately 20 percent.



YOUR RESULT:

## LOW CRP LEVEL

The analysis of your DNA has shown that your genetic makeup determines that you are more likely to have a lower CRP level compared to the rest of the population.

### Recommendations:

- Your genes work towards a lower CRP level, which is positive, as CRP is a marker of inflammation.
- To keep your CRP low, make sure to follow the recommendations on diet and lifestyle, as only a good variant of CRP gene by itself is not enough to keep your CRP low.
- Foods rich in fibre (vegetables, beans and whole-grain products) can positively affect your CRP level. Fibre reduces blood sugar level and in this way reduces inflammation and CRP level.
- Try to find some time for relaxation on a regular basis. Stress causes your body to release more inflammatory chemicals. Consequently, CRP level rises.
- Use spices that have an anti-inflammatory effect, such as ginger and turmeric. Add ginger to your tea and turmeric to main dishes.

*Measuring our CRP helps doctors to distinguish between viral and bacterial infections. A viral infection usually has little effect on CRP blood level and concentrations from 10–60 mg/L are expected, while in the case of bacterial infections, expected CRP level is higher than 100mg/l. The reason for this is that our body fights against viral and bacterial infections in a different way. Viruses are recognised by so-called natural killer cells which kill infected cells while in the case of bacteria, our body activates neutrophils and macrophages; chemicals secreted by activated macrophages induce inflammation and speed up production of CRP.*

#### FACT

CRP levels may also increase in people with obstructive sleep apnoea.

#### OPTIMAL SERUM LEVEL

Between 0.8 and 3.0 mg/L.

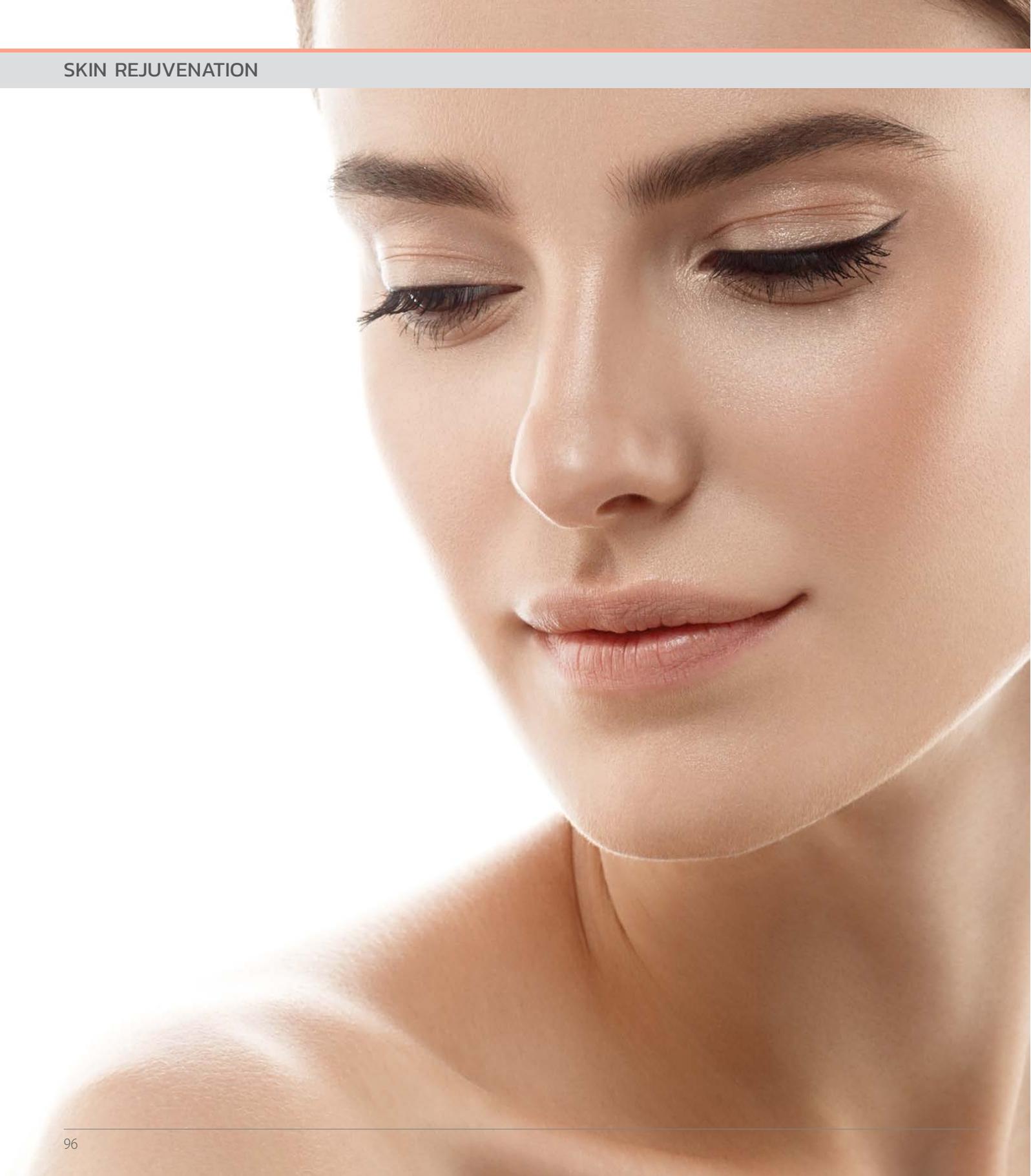
#### WHAT INCREASES IT?

Inflammation, infection, trauma, necrosis, malignancy, and allergic reaction.

#### WHAT DECREASES IT?

Mediterranean diet, vitamin C, probiotic rich foods.



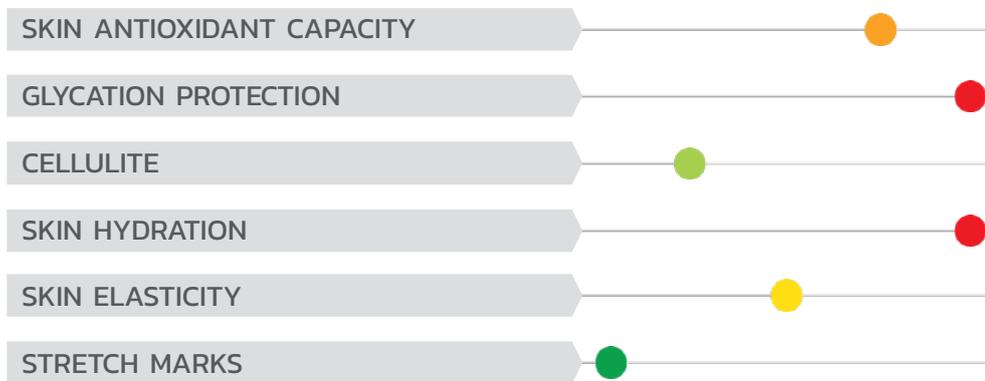


# SKIN REJUVENATION

The skin is the largest organ in your body. It acts as a barrier, isolating you from the environment, protecting your body and contributing to keeping its structures intact, while also acting as a system for communicating with the environment. Because the skin is the outermost organ in direct contact with the environment, it is also the area in which the ageing processes are most clearly seen.

Skin changes are complex processes influenced by heritable and environmental factors. Recent studies have shown that up to 60 percent of skin ageing may be attributed to genetic factors. In this report you will learn more about your skin, about its antioxidant capability, elasticity, benefits related to structural collagen and the skin's hydration capacity. These are the properties that play a key role in the health of your skin.

Although our skin appearance is largely related to genetic factors, environmental factors and nutrition also contribute to it. UV radiation, pollution, changes in temperature, smoking, and suffering stressful situations can largely accelerate the ageing process of your skin. Therefore, the overall knowledge of the genetic and environmental factors that influence the condition of your skin will help you to take care of lifestyle habits and treatments to maintain or enhance a healthy and youthful appearance.



## SKIN ANTIOXIDANT CAPACITY

Proper **antioxidant protection** is of great importance for our health as our body is continually exposed to environmental pollutants and other agents, all of them capable of inducing harmful free radicals in our cells. Free radicals can be naturally produced during some metabolic processes, and can also be induced by different environmental pollutants, too extensive UV exposure, poor nutrition, alcohol consumption and smoking.

To neutralise the harmful effects of free radicals, our body possesses appropriate defence mechanisms. These antioxidant protection mechanisms help to protect our cells against free radicals by cascades of chemical reactions, all this to neutralise or at least to reduce their negative impact. Efficient antioxidant protection helps us to reduce the formation of wrinkles and preserve healthy and youthful-looking skin. If antioxidant protection is weakened, collagen (important for structural support to the skin) degrades, which can further cause progressive damage of cellular structures and premature skin ageing.

**NQO1, SOD2, CAT** and **GPX1** are key enzymes responsible for antioxidant protection. Genetic variations in all the genes encoding these enzymes have been associated with an increased risk of oxidative stress or a reduction in antioxidant response, which increases the ageing of the skin.



### YOUR RESULT: **SLIGHTLY LESS EFFICIENT ANTIOXIDANT PROTECTION**

The analysis of your DNA has shown that the antioxidant protection of your skin is slightly less efficient, however still in the average range.

### Recommendations:

- Vitamin C, vitamin E, coenzyme Q10, resveratrol, green tea, and coffee berry polyphenols have all shown efficiency as antioxidants and free radical scavengers for skin protection.
- Acerola can provide the highest amount of vitamin C. Vitamin C is also found in red pepper, cabbage, rosehip and citruses (oranges, grapefruit and lemons).
- We recommend eating foods which contain plenty of coenzyme Q10, as it is one of the most important antioxidants. Our body produces it, but its production gradually diminishes with age. Food sources include meat (beef, chicken), fatty fish (mackerel, sardines), spinach, broccoli, cauliflower, and nuts. Coenzyme Q10 can be also found in the form of oral supplements and topical preparations.
- We recommend eating foods rich in flavonoids, which are also among important antioxidants. They are found in green tea, citruses, wine and dark chocolate.
- Micronutrients lycopene (found in tomatoes), omega-3 fatty acids (found in fish oil) and isoflavones (found in soy) are also active compounds that help enhance skin antioxidant protection.
- Avoid deep-fat frying at high temperatures, especially with unsaturated oils. Better alternatives include braising, simmering, and sautéing, using olive or coconut oils instead of regular seed oils.

#### FACT

Oxidative stress is responsible for skin ageing - the depth of wrinkles and loss of elasticity.

#### WHAT INCREASES IT?

Environmental pollutants, UV exposure, poor nutrition, alcohol consumption, smoking.

#### WHAT DECREASES IT?

Antioxidants (selenium, zinc, vitamins A, C and E), coenzyme Q10, fresh fruits and vegetables.

# GLYCATION PROTECTION

**Glycation** is a process during which excess glucose molecules bind to the collagen and elastin fibres. Together with its end products (glycation end products (AGEs)), glycation represents one of the main threats to our skin. It negatively affects skin's structural integrity and it's the leading cause of skin ageing. Glycated skin fibres become less elastic and have reduced the ability to self-repair. This can lead to dry skin, skin laxity and can cause the formation of wrinkles.

Our cells are protected against AGEs by the glyoxalase 1 enzyme, which converts AGEs into less toxic molecules. A mutation within the **GLO1 gene**, which encodes for the glyoxalase 1 enzyme can cause the enzyme to be less effective. Proper nutrition is therefore the key to healthy skin for such individuals.



YOUR RESULT:

## LESS EFFICIENT PROTECTION

The analysis of your DNA has revealed that your **GLO1 gene** encodes for a less active glyoxalase 1 enzyme.

### Recommendations:

- Your GLO1 gene encodes for less efficient protection against skin glycation.
- Try to limit your intake of products that are high in sugar and fructose corn syrup. These are popular ingredients in soda, fruit-flavoured drinks, packaged bread and crackers. When buying foods, read the labels and check the sugar content.
- When preparing your meal, we recommend you use spices and herbs such as ginger, cinnamon, cloves, rosemary, nutmeg, turmeric and ginseng. These are known to inhibit glycation because of high phenols content.
- Vitamins A, C and E can help to replenish collagen levels and, in this way, slow the ageing process. We recommend that you use the nutrition charts and select those food items which are rich in these vitamins.

#### FACT

Glycation is the leading cause of skin ageing.

#### WHAT INCREASES IT?

Sugar, fructose and processed foods consumption.

#### WHAT DECREASES IT?

Antioxidants (selenium, zinc, vitamins A, C and E), herbs and spices (cinnamon, ginger, rosemary, etc.).

*The cross-links formed between sugar and protein molecules emit a fluorescence. If you take a fluorescent image of young people, their skin will come out very dark, but with getting older the AGEs will accumulate and the brightness will increase.*

## CELLULITE

Cellulite is a term for the typical accumulation of subcutaneous fat that results in a dimpled, lumpy appearance of the skin and is often called “orange peel skin”. Usually, cellulite appears in the area of the thighs, hips and buttocks. Cellulite does not affect your health. However, it’s in our nature to prefer smooth skin.

On average, cellulite is present in 90% of women and 10% of men and is more common in Caucasians compared to Asians. The development of cellulite depends on many factors including hormonal changes, gender, ethnicity, age, excessive weight, poor diet, lack of physical activity, dehydration and our genetics. Studies identified the genes ACE and HIF1A as major genetic contributors in cellulite development. Scientists proved that carriers of the mutation within the gene HIF1A have a 50% lower risk of cellulite development before the age of 30 compared to individuals without this mutation.



YOUR RESULT:

**LOWER RISK**

Genetic analysis has shown that your genes have a protective influence against developing cellulite.

### Recommendations:

- To minimise the likelihood of cellulite appearance the most general advice would be to eat healthily and to be physically active on a regular basis.
- Physical activity will help against the development of cellulite by increasing your blood flow! Increased blood circulation can help your body to fight against cellulite, since it enhances the ability of your body to release fat deposits and use them as an energy source.
- Drink enough water. A good way to ensure sufficient water supply is to eat vegetables with high water content, like cucumbers and tomatoes. Water keeps your tissues strong and flexible.
- Unfortunately, there is no permanent solution to get rid of cellulite you already have, but there are many short-time possibilities to decrease the dimpled appearance. Using retinol cream, having an anti-cellulite massage or laser therapy will obviously reduce the orange peel skin. If you want that effect to last, you will need to use such treatments regularly.

#### FACT

Up to 90% of post-pubertal women and 10% of men have cellulite.

#### WHAT INCREASES IT?

Hormonal changes, excess weight, poor diet, lack of exercise, dehydration.

#### WHAT DECREASES IT?

Exercise, staying hydrated and dry brushing.

*Even movie stars have cellulite! It is true that most of us perhaps prefer to have smooth skin, but if you have some cellulite you are definitely not alone and most importantly—it does not affect your health.*

## SKIN HYDRATION

Skin is a protective barrier which needs to be sufficiently hydrated. Hydration is essential to ensure skin elasticity and proper functioning, especially the skin's outer layer, called stratum corneum, which contains 10–20 percent water. Dry, dehydrated skin can lose its soft, flexible characteristics and may crack or even bleed, which can lead to the increased risk of infection. Dehydrated skin also contributes to the development of visible wrinkles. Loss of water from the skin must be therefore carefully regulated. Aquaporin-3 (AQP3) is a protein, encoded by the AQP3 gene, that forms pores in the membrane of skin cells through which water can be transported more rapidly inside the cell. AQP3 regulates the movement of water and glycerol molecules across cell membranes, while preventing the passage of ions and other solutes. AQP3 is therefore an essential hydration-regulating element of our skin and is fundamental in general skin hydration, skin elasticity, wound healing and epidermal biosynthesis. Studies have revealed that up to 60 percent of the skin ageing variation between individuals can be attributed to genetic factors, while the remaining 40 percent is due to non-genetic factors like sudden temperature changes, prolonged exposure to solar radiation, harsh soaps and malnutrition.



YOUR RESULT:

### DECREASED HYDRATION ABILITY

The genetic analysis has revealed that you are a carrier of two unfavourable copies of AQP3 gene. That indicates reduced (natural) hydration ability of your skin.

#### Recommendations:

- Your genetic makeup determines that you have, compared to people with one or two favourable copies of AQP3 gene, reduced hydration ability and you are therefore more susceptible to dry skin.
- However, you can do a lot to make your skin hydrated, by actively following our recommendations.
- Use moisturisers and night creams regularly. They should include ingredients in one of three different classes to help promote skin hydration: humectant, emollients, and occlusive.
- One of the best humectants is hyaluronic acid. It holds water molecules on the surface of your skin to keep hydrated.
- You can also prepare a facial mask on a basis of honey. Honey is a humectant, which helps your skin to absorb moisture.
- Try to add moisturisers like jojoba oil or rosehip seed oil into your regular cream.
- Do not use soap and water to wash your face. Soap is naturally alkaline therefore it alters your skin's ACIDITY and makes skin dry.
- Try to avoid lotions or creams that include perfumes.
- Your diet has also a significant impact on your skin's health. Lack of micronutrients leads to lack of moisture. Eating salmon, avocado, papaya, olive oil and nuts will help you to hydrate and rejuvenate dry skin.

*Do you enjoy taking long hot showers? As pleasant as that can be, the heat from hot water combined with soap softens your skin and slowly strips away its natural, oily protective barrier. That can lead to a feeling of dryness and itchiness. The longer and hotter the shower is, the more moisture you can lose.*

#### FACT

Just drinking water may not be enough for proper skin hydration, so try using hydration creams as well.

#### WHAT INCREASES IT?

Temperature change, prolonged sun exposure, long showers, soaps.

#### WHAT DECREASES IT?

Hyaluronic acid, jojoba and rosehip seed oil, choose skin masks containing honey.

## SKIN ELASTICITY

**Elasticity** is the skin's ability to stretch and revert to its original shape without developing wrinkles and other imperfections. This ability depends on collagen, the protein responsible for the strength and firmness of connective tissues. Collagen is continually produced throughout life. When we are younger, the production of collagen predominates, whereas as we age the breakdown of collagen increases, contributing to loss of skin elasticity and the appearance of wrinkles.

Some people are prone to break down collagen faster than others. Matrix metalloproteinases (MMPs) are the enzymes that break down the collagen from the skin. The controlled removal of old collagen keeps the youthful appearance of our skin. If mutation within the **MMP1** or **MMP3** gene is present, collagen breakdown will predominate and cause loss of elasticity and firmness.



### YOUR RESULT: **AVERAGE RISK OF LOSING SKIN ELASTICITY**

Genetic analysis has shown that you have an average risk of premature loss of skin elasticity.

### Recommendations:

- Your genes encode balanced collagen production and degradation. With an appropriate lifestyle and nutrition you can further improve your state.
- There are many environmental factors which, beside your genes, influence collagen production and degradation. Taking them into account can slow down skin ageing processes.
- Try to avoid chlorinated water. Chlorine increases the level of the enzyme MMP which is involved in collagen degradation and consequently connected with the loss of skin elasticity. Luckily, you can easily remove chlorine from water by using carbon-based chlorine removal filters.
- If you have already noticed your first wrinkles, you can take supplements that boost collagen production or inhibit the MMP-1 enzyme. One of the options is hops extract which shows good results in slowing down skin ageing.
- Different skin care products may help you to keep your skin firm and plump. Choose those that contain polyphenols, carotenoids or flavonoids.

#### FACT

There are 29 types of collagen in our body, but only two are found in our skin (types I and III).

#### WHAT INCREASES IT?

Bone broth (rich in collagen), antioxidants (selenium, zinc, vitamins A, C and E), rose hip.

#### WHAT DECREASES IT?

Smoking, prolonged sun exposure, environmental pollutants, poor nutrition.

*Collagen, the protein which keeps your skin firm, plump and wrinkle-free, represents up to 75 percent of your skin and is the most abundant protein in the body.*

## STRETCH MARKS

**Stretch marks** typically appear as bands of parallel lines on our skin. The lines are usually purple or bright pink and have a different texture from your normal skin. They most commonly appear in the area of the stomach, breasts, thighs, buttocks and upper arms. Stretch marks often fade over time and become less visible, however once they are formed, they never completely disappear.

Stretch marks are present in more than 50% of women and more than 20% of men. They are usually formed during excessive skin distension. They can occur as a consequence of rapid weight gain or bodybuilding (especially in combination with steroids), during pregnancy, due to rapid growth (teenagers) or deployment of certain parts of the body. Scientific studies have shown that some individuals are more susceptible to formation of stretch marks than others due to their genetic background.



### YOUR RESULT: **DECREASED RISK FOR STRETCH MARKS**

Genetic analysis has shown that you have a decreased risk for the formation of stretch marks.

### Recommendations:

- Rapid weight gain or rapid weight loss may both cause the formation of stretch marks. Therefore, it's wise to avoid restrictive diets.
- To boost your overall skin health, put foods rich in zinc (nuts, fish) on your menu. Zinc reduces inflammation and helps in processes of wound healing. It may also reduce skin's tendency to develop stretch marks.
- Studies have shown that a high level of vitamin D decreases the risk of appearance of stretch marks. The easiest way to get vitamin D is to be exposed to the sun.
- Try to find some time for relaxation on a weekly basis. Studies have shown the link between stress and the development of stretch marks.

*According to the latest research, more than 75 percent of women develop stretch marks during pregnancy. It is due to the excessive skin distension in the abdominal area, which occurs when the baby is growing and needs more space. Using creams and other products which boost collagen production and increase skin elasticity may slightly decrease the risk of formation of stretch marks during pregnancy.*



#### FACT

Stretch marks are present in more than 50% of women and more than 20% of men.

#### WHAT INCREASES THEM?

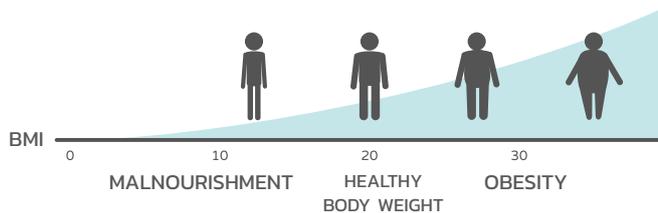
Rapid body changes like puberty, weight gain, pregnancy or body building.

#### WHAT PREVENTS THEM?

Stable body weight, diet rich in vitamin C and collagen.

## MORE ON EXCESS WEIGHT AND BODY MASS INDEX

We define the appropriateness of body weight with the body mass index (BMI), which was established in the 19th century by a Belgian statistician Lambert Adolphe Jacques Quételet. It is calculated by dividing a person's body weight in kilograms by the square of the person's height in metres. **An optimal BMI of an individual is in the area between 18.5 and 24.9 kg/m<sup>2</sup>.** People with such a BMI are said to have a healthy body weight. A **BMI lower than 18.5 kg/m<sup>2</sup>** is an indicator of malnourishment, and obesity is defined with a **BMI higher than 30 kg/m<sup>2</sup>.** The definition of obesity is not appropriate for two groups of people. In the first group, there are those with a high muscle mass, and this is the reason why their BMI is higher than 30 kg/m<sup>2</sup>. And in the second group, there are older people, who can have BMI lower than 30 kg/m<sup>2</sup>, because of rapid loss of muscle mass which is replaced by fatty tissue but are still overweight.



According to the data of World Health Organization (WHO), in 2005, approximately 1.6 billion people were overweight and 400 million were obese. In the USA, 61 percent of people were overweight and 20.9 percent were obese. As a result, in 1997 WHO defined obesity as a chronic metabolic disease, and shortly after named it as an epidemic that threatens the whole world. The definition is supported by a piece of information which shows that, in Western European countries, 2 to 8 percent of all health expenses are dedicated to treating obesity.

The state of being overweight is caused by an imbalance between the intake and the use of energy, lack of physical activity and genetic background. When we consume more calories than we daily expend, the excess generally accumulates in the form of fats. Fats are deposited in our fat cells, which start to grow and multiply. In order to reduce our body mass, we therefore need to burn more calories than we consume. Energy consumption largely depends on the so-called basal metabolism – basic metabolism. It is the smallest amount of energy which is necessary each day for a normal maintenance of basic life activities of our body. People who are overweight have a lower basal metabolism rate and require a lower daily energy intake. Basal metabolism largely depends on our genetic makeup. It has been shown that there is an 80 percent probability that children of obese parents will also become obese. Scientists have discovered that our genetic makeup determines 60 percent of our final body weight, and the rest depends on other factors of life. It is important to bear in mind that environmental factors are mostly the ones that determine whether obesity will develop or not.

## MORE ON VITAMINS

**Vitamins**, together with minerals, belong to a group of micronutrients. Even though we need them in very small amounts, they are vital for the functioning of our body. Most vitamins cannot be synthesised by our body, so they are essential and must come from food. Even though vitamins are not a source of energy, they are very important for our body. They participate in antioxidative processes, cell-renewal processes, numerous enzyme reactions and they are key co-factors which help the enzymes in an array of different metabolic reactions and biochemical organisms. Most enzymes actually cannot function without the help of vitamins.



## MORE ON ANALYSES

Vitamins can be divided into 2 groups:

- **Fat-soluble (A, D, E, K)**

Fat-soluble vitamins, however, can be found in fatty parts of the animal as well as vegetable oils and dairy food. These vitamins accumulate in the body. Therefore, in the case of vitamins A, D, E, and K, there can be an excess intake of them.

- **Water-soluble (B, C).**

Water-soluble vitamins are usually not stored in the body in large quantities and are quickly lost in the process of storing, processing and preparing foods. For a sufficient intake of water-soluble vitamins, it is recommended to eat grains and unprocessed, fresh foods.

Vitamin D is a little bit different from the other vitamins. Since vitamin D is found in only a small number of foods, it can be difficult to get enough from foods alone. People need to get most of their vitamin D from exposure to sunlight which help the body to synthesise it. The majority of people aged 5 years and above usually get enough vitamin D from sunlight when they are outdoors for at least 15 minutes. Some population groups (with very little or no sunshine exposure) will not obtain enough vitamin D from sunlight and are at greater risk of vitamin D deficiency. Those people are frequently advised to take supplements to ensure the daily requirements.

## MORE ON MINERALS

Most of the minerals have the role of co-factors, and they are, therefore, vital for enzyme activity and the regulation of the chemical balance. Minerals are important for the formation of different hormones and other key molecules in the body, strength of teeth and bones, an appropriate heart and kidney function, the transmission of nervous impulses, controlling body fluids inside and outside cells and turning the food you eat into energy.

Considering our daily mineral requirements, we divide them into two groups:

- **MACROMINERALS:** Calcium, phosphorus and magnesium, which are the main constituents of bones, and sodium and potassium, which regulate the balance of the water in the body, are all macrominerals. Daily, we require relatively high amounts of them – from 50 to 3000 mg.
- **MICROMINERALS:** elements that our body requires only in traces (from 30 mcg to 50 mg). Those are iron, zinc, manganese, copper, chrome, and selenium.

Despite the fact that we require so little of them, they are indispensable, as our body cannot function without them. We consume them either directly with plants or with the meat of an animal that is herbivorous. The sources of minerals are actually plants that have the ability to incorporate them from the soil. However, minerals are sometimes unavailable to our body. On average, only about 18% of the iron we eat is actually taken up into the body where it can be used. This is increased to around 25% when iron is eaten in meat, but as low as 5% from spinach and cereals. These plant foods contain other components such as fibre, phytates, oxalates and tannins, all of which reduce iron's availability. Therefore, vegetarians may need up to 80% more iron and 50% more zinc than meat eaters.

Nowadays, a lack of minerals is also common for many other reasons. Firstly, the amount of minerals in crops is decreasing because of soil impoverishment, which is the result of intensive farming techniques. Intensively grown plants grow quickly, have higher water content and incorporate fewer minerals than a non-intensively grown plant. Secondly, there is less mineral content in food because of the processing and preparation of food. Refined cereals and sugars, compared to whole wheat cereals, contain only a few percent of minerals. And, last but not least, we are exposed to more harmful substances and nutritionally poor food which depletes our body and, as a consequence, our mineral requirements of are often increased.



### MORE ON CHOLESTEROL AND FAT METABOLISM

Cholesterol is a white-yellowish substance similar to fat. Triglycerides are molecules, built of three fatty acids bound on glycerol. All foods of animal origin contain cholesterol, while there is no cholesterol in foods of plant origin. It is the basic constituent of all the cells in our body, and sexual and adrenal hormones are formed from it, as well as vitamin D and gall acids. Since we usually do not have problems with the lack of it, a lower cholesterol level is generally more favourable. A desired general cholesterol level is less than 5 mmol/L, but even more important is the ratio between bad LDL and good HDL cholesterol, which should not be lower than 4:1, or for genetically and environmentally more challenged people, 3:1. It is true that 80 percent of cholesterol is produced by the body, while the cholesterol from food represents 20 percent of the entire amount of cholesterol. In healthy people, with the intake of cholesterol with food, its production in the body usually decreases. In people with an unfavourable genetic makeup, this regulation is not optimal, and it can cause an increase of LDL cholesterol as well as the level of triglycerides.

The cholesterol and triglyceride metabolism is quite complicated. They are water-insoluble molecules, and, after ingestion, they bind with substances called lipoproteins in the intestinal villi, in order to enter the bloodstream. In the meantime, cholesterol, which is produced by the body in the liver, binds with particles known as VLDL and also enters the bloodstream. From the VLDL complexes, free fatty acids start to detach and enter fat cells where they are transformed back into triglycerides. This way, we get particles known as IDL which further lose triglycerides and we get LDL. In everyday life, we normally mention only LDL and HDL. LDL particles contain few triglycerides and are rich in esterified cholesterol (cholesterol bound with fatty acids) and they represent a huge container of cholesterol for the synthesis of steroids, membranes and gall acids. LDL particles transport up to two-thirds of cholesterol, also known as harmful cholesterol, around the body, even though it is not necessary for the optimal functioning of the body. They transport it from the liver to other parts of the body. HDL particles, however, do just the opposite. They transport the cholesterol in the opposite direction; they eliminate it from the bloodstream and return it to the liver, where a greater part of it is excreted in the form of gall acids. The majority of it is absorbed into the liver again and then into the blood. This process is called "enterohepatic circulation". HDL, therefore, protects the cells of the vascular wall, inhibits the oxidation of LDL cholesterol and prevents clumping of blood platelets – thrombocytes, which accumulate at the site of a damaged vascular wall. Because of this function, it has acquired names such as good, beneficial and protective cholesterol. If the LDL cholesterol concentration overly increases or the HDL cholesterol concentration overly decreases, we risk cardiovascular and coronary disease, such as angina pectoris, heart attack, brain stroke, leg artery disease, etc. The problem is also the oxidation of LDL cholesterol which is encouraged by bad habits, which can lead to cardiovascular disease. Hence, it is crucial for our health to pay attention to our diet, exercise and not succumb to bad habits such as alcohol drinking and smoking.

### MORE ON OMEGA-3 FATTY ACIDS

Omega-3 fatty acids are a type of unsaturated fat and are essential for our body to function normally. We don't naturally produce omega-3 within our body and it is important we take in enough of it as part of our diet. It has been shown that sufficient daily intake of omega-3 can help towards lowering our blood pressure and level of triglycerides and at the same time is responsible for the proper functioning of the cardiovascular system and the brain.



### MORE ON BLOOD SUGAR

Carbohydrates are part of a large group of molecules which represent the main energy source for our body. After consumption, our body breaks down complex carbohydrates or tries to break them down into the simplest ones, monosaccharides. Our body turns most of the sugars into glucose, and our cells can use them as a basic source of energy. Only then are the molecules small enough to enter our bloodstream. An exception is fibre, which is built in such a way that our body cannot break it down to monosaccharides, and it therefore passes the intestinal tract intact. However, it is generally true that our body breaks down consumed carbohydrates into glucose, which then enters the bloodstream. The result is the increase in blood sugar, and special cells start to secrete insulin. This is a sign that cells have to accept sugar from the blood, and that blood sugar supplies have to stop entering the bloodstream. Slowly, the blood sugar level drops to its initial level. An adequate regulation ensures that the blood sugar level does not increase too much, and that it quickly drops to the basic level, and that it is always available. In some people, this regulation is not adequate. In countless research studies, scientists have discovered that, due to mutations in the genetic makeup, two types of abnormalities occur:

- The body does not produce enough insulin, and the blood sugar level drops more slowly to an appropriate level.
- Cells are less sensitive to insulin, and liver cells, therefore, despite the fact that glucose and insulin concentration increases sufficiently, do not cease to secrete glucose supplies.

All this can lead to a permanently increased blood sugar level and, consequently, to diabetes. This risk can effectively be reduced with an appropriate diet and lifestyle.

An exception is the metabolism of a monosaccharide fructose, which is carried out differently. Fructose, as opposed to glucose, does not influence the increase of blood sugar level, because it does not need insulin for its metabolism – this is why, in small amounts, it is allowed also for diabetics. However, excessive fructose is far from healthy, because its metabolism is similar to that of fat. Nowadays, in America, fructose is one of the main reasons for increased LDL cholesterol and triglyceride levels, as well as a decreased HDL cholesterol level and unresponsiveness to insulin. The majority of fructose is consumed as a sweetener added to various food products, and it is therefore wise to read food labels (where possible) and choose foods without added sugars.



## MORE ON MUSCLE STRUCTURE

We know **fast-** and **slow-twitch muscle fibres**. These two types of fibres differ in structure as well as their functioning. Slow-twitch muscle fibre produces energy mostly with cell respiration, and its main energy source is fats. It does not fatigue so easily, and is red coloured, because of a substance called myoglobin. Fast-twitch muscle fibre, however, is rich in glycogen, and its energy source is not fat, but basic constituents, glucose and creatine phosphate. It can lack oxygen and lactic acid starts to form, making the muscles become tired.



While studying neuromuscular disease, Australian scientists have started to pay attention to the alpha-actinin (ACTN3) gene, the product of which is important for muscle cell contraction. They have discovered that the product of this gene is present only in fast-twitch muscle fibre. They have identified a mutation which causes the product of this gene to become inactive, and, therefore, ACTN3 is absent in such people. In the research, which included top athletes, they discovered that sprinters mostly have two active copies of the **ACTN3 gene**, while long-distance runners have two inactive variants of the gene. They have thereby proven the hypothesis that an active ACTN3 gene is required for the explosiveness of muscles. In a second study, the scientists proved that fast-twitch muscle fibre, in which the ACTN3 gene is inactive, uses more oxygen than that which has at least one active copy of the gene present. A greater need for oxygen slows down the muscles. Muscle fibre with an inactive ACTN3 gene is supposedly weaker and smaller, but it also become fatigued much later.

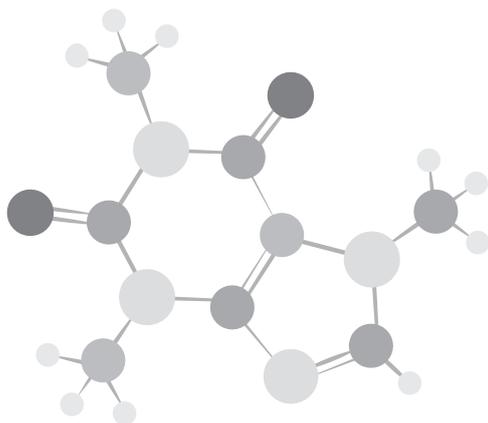
**PPAR-alpha** is another gene which scientists claim to be more active in slow-twitch muscle fibre, which is logical, considering its function. Namely, PPAR-alpha regulates the activity of genes responsible for the oxidation of fat. Endurance training actually increases the consumption of fat and, through the activity of the PPAR-alpha gene, increases the oxidative capacity of muscles. Because of its role in regulating the activity of numerous genes which encode muscle enzymes involved in the oxidation of fat, PPAR-alpha is probably an important component of the adaptive response to endurance training. In this gene, there is a known mutation which influences the gene's activity and even influences the ratio of fast- and slow-twitch muscle fibre in our body. A changed sequence of the gene influences a lower activity of the PPAR-alpha gene in slow-twitch muscle fibre, and causes the percentage of slow-twitch muscle fibre in our body to decrease, while the percentage of fast-twitch muscle fibre to increase. A mutated variant of the gene is present mostly in athletes who need strength and explosiveness for their disciplines.



### MORE ON CAFFEINE

**Caffeine** belongs to **alkaloids**, and its chemical name is 1,3,7-trimethylxanthine. In its pure form, it is a crystalline powder that has a slightly sour taste. It can be found in more than 60 plant species, in different parts of plants: coffee and cocoa beans, specific types of hazelnuts and in tea leaves, where it forms complexes, together with tannins. It is a mild stimulant, which stimulates the entire nervous system and the heart, and, in addition, functions as a weak diuretic – it accelerates the excretion of urine. It also has a psychological effect (excitation, unrest, better well-being), as well as a physiological one (increased alertness and concentration, reduced fatigue, increases metabolism, increases blood pressure). A cup of coffee contains approximately 200 mg of caffeine, a cup of tea approximately 80 mg of tein, and “coca-cola” somewhere from 40 to 70 mg of caffeine. High doses can cause unpleasant side-effects such as restlessness, trembling, and problems with blood pressure. A cup of coffee a day is supposedly appropriate for everyone, or does not seem to have a negative effect on health.

Caffeine is absorbed into the blood approximately 5 minutes after the consumption of coffee. The final effect is already visible after 30 minutes, and it lasts for hours. Caffeine does not accumulate in the body, but is degraded and excreted from the body within 24 hours. Caffeine is metabolised in the liver by an initial demethylation process through an enzyme called cytochrome **P4501A2 (CYP1A2)**. This enzyme is responsible for 95 percent of caffeine metabolism. A high functional variability is characteristic of this enzyme, which is, among other things, a result of differences in our genetic makeup. Genetic mutations importantly influence the efficiency of its functioning and greatly determine the rate of an individual’s caffeine metabolism, which can be measured by determining the ratio of plasma (or urinary) caffeine, and the amount of metabolic products of caffeine after consuming a certain amount of coffee.



## A WAY TO YOUR IDEAL BODY WEIGHT

Gene	Analysis	Role of the gene	Genotype
<b>ADIPOQ</b>	Weight loss-regain	<i>A gene expressed in fatty tissue. It regulates fat metabolism and sensitivity to insulin.</i>	<b>GG</b>
<b>INSIG2</b>	Risk of being overweight	<i>A protein found in the endoplasmic reticulum of the cells and blocks the processing of the protein SREB in order to regulate the synthesis of cholesterol.</i>	<b>GG</b>
<b>MC4R</b>	Risk of being overweight	<i>A receptor involved in many physiological processes, such as regulation of energy consumption/storage in the body, the formation of steroids and control of temperature.</i>	<b>TT</b>
<b>TNFA</b>	Risk of being overweight	<i>A cytokine, which is secreted by macrophages. It has an important role in the immune response to infections.</i>	<b>GG</b>
<b>PCSK1</b>	Risk of being overweight	<i>An enzyme which processes proinsulin type I, and, therefore, has an important role in regulating the biosynthesis of insulin.</i>	<b>AA</b>
<b>NRXN3</b>	Risk of being overweight	<i>A protein from the family of neuroligins, which function as adhesive molecules and receptors in the nervous system.</i>	<b>AA</b>
<b>FTO</b>	Risk of being overweight	<i>A gene that determines the development of excess body weight.</i>	<b>AT</b>
<b>TMEM18</b>	Risk of being overweight	<i>A highly conserved protein, which is predominantly expressed in brains.</i>	<b>CC</b>
<b>GNPDA2</b>	Risk of being overweight	<i>A gene involved in the development of excess body weight.</i>	<b>AG</b>
<b>BDNF</b>	Risk of being overweight	<i>A protein from the family of nerve growth factors. It is involved in the survival and differentiation of certain neurons.</i>	<b>GG</b>
<b>APOA2</b>	Risk for being overweight	<i>A protein, which is the second most represented component of HDL particles. It has an important role in the HDL metabolism.</i>	<b>TT</b>
<b>APOA2</b>	Response to saturated fats	<i>A protein, which is the second most represented component of HDL particles. It has an important role in the HDL metabolism.</i>	<b>TT</b>
<b>ADIPOQ</b>	Response to monounsaturated fats	<i>A gene expressed in the fatty tissue. It regulates fat metabolism and sensitivity to insulin.</i>	<b>GG</b>
<b>PPAR alpha(1)</b>	Response to polyunsaturated fats	<i>Regulator of the synthesis of fatty acids, the oxidation, gluconeogenesis and ketogenesis.</i>	<b>CC</b>
<b>FTO</b>	Response to carbohydrates	<i>A gene involved in the development of excess body weight.</i>	<b>AT</b>
<b>KCTD10</b>	Response to carbohydrates	<i>A gene that encodes the domain of the potassium channel, responsible for its selective transport through the cell membrane.</i>	<b>CG</b>

## WHICH VITAMINS AND MINERALS DOES YOUR BODY NEED?

Gene	Analysis	Role of the gene	Genotype
<b>ALPL</b>	Vitamin B6	<i>An enzyme which functions in an alkaline environment and is crucial for growth and development of bones and teeth, as it is involved in the process of mineralisation, which is the process of accumulation of calcium and phosphorus. It also influences the level of vitamin B6.</i>	<b>TT</b>
<b>MTHFR</b>	Vitamin B9	<i>Reduces 5,10-methylene-tetra-hydro-folate into methyl-tetra-hydro-folate and is, therefore, important for absorption of vitamin B9.</i>	<b>CC</b>
<b>FUT2</b>	Vitamin B12	<i>A protein which influences the level of vitamin B12.</i>	<b>GG</b>
<b>GC</b>	Vitamin D	<i>Binding and transport of vitamin D and its metabolites through the body, and influencing the vitamin D level.</i>	<b>AA</b>
<b>DHCR7</b>	Vitamin D	<i>7-dehydrocholesterol transforms vitamin D3, which is the precursor of 25-hydroxyvitamin D3, into cholesterol, and in this way eliminates the substrate from the synthetic pathway.</i>	<b>GG</b>
<b>CYP2R1</b>	Vitamin D	<i>Transforms vitamin D into an active form, so that it can bind with the receptor for vitamin D.</i>	<b>GG</b>
<b>TMPRSS6</b>	Iron	<i>An enzyme which is found on the cell surface and is involved in the uptake and recycling of iron.</i>	<b>AA</b>
<b>HFE</b>	Iron	<i>An enzyme which is found on the cell surface. It detects the amount of iron in the body and regulates the production of protein hepcidin, which is the main iron-regulating hormone in the body.</i>	<b>GG</b>
<b>AGT</b>	Sodium (salt)	<i>A gene expressed in the liver. It activates with low pressure through renin and angiotensin converting enzyme (ACE), where angiotensin II is formed. It is in charge of the maintenance of blood pressure and electrolyte homeostasis.</i>	<b>CC</b>
<b>CLCNKA</b>	Sodium (salt)	<i>Chloride channel with 12 transmembrane domains, which is in charge of the maintenance of blood pressure.</i>	<b>AA</b>
<b>WNK1</b>	Potassium	<i>A protein which is responsible for the transport of sodium and potassium. It is included in electrolyte homeostasis and regulation of blood pressure.</i>	<b>AA</b>
<b>COL1A1</b>	Bone density	<i>Collagen type I built from two alpha 1 chains and one alpha 2 chain. Collagen is the main protein of the organic part of the bone matrix (98%).</i>	<b>GG</b>
<b>GPR177</b>	Bone density	<i>A protein which is part of the evolutionary highly conserved Wnt signal pathway, which is important for the differentiation and development of bone cells, and the resorption of bone material.</i>	<b>AA</b>
<b>DCDC5</b>	Bone density	<i>A highly conserved element, which serves as a template for protein links.</i>	<b>GG</b>
<b>ZBTB40(1)</b>	Bone density	<i>A protein found in the bone tissue and which influences bone density.</i>	<b>AG</b>
<b>ZBTB40(2)</b>	Bone density	<i>A protein found in the bone tissue and which influences bone density.</i>	<b>GG</b>

## WHICH VITAMINS AND MINERALS DOES YOUR BODY NEED?

Gene	Analysis	Role of the gene	Genotype
<b>ESR1</b>	Bone density	<i>A transcription factor involved in the regulation of the expression of genes, which influences the proliferation of cells and differentiation of tissues. It is responsible for growth and maintenance of the strength of human bones.</i>	<b>AG</b>
<b>C6ORF97</b>	Bone density	<i>A protein which influences bone density.</i>	<b>CT</b>
<b>SP7</b>	Bone density	<i>Transcription factor and the activator of bone cell differentiation.</i>	<b>AG</b>
<b>AKAP11</b>	Bone density	<i>Member of a structurally completely different group of proteins, which have a common function of binding the regulatory subunit of kinase A. It is highly expressed during spermatogenesis. It is found next to the RANKL gene, which has an important role in bone metabolism.</i>	<b>CC</b>
<b>TNFRSF11A</b>	Bone density	<i>It is essential for RANKL-regulated osteoclastogenesis – the formation of osteoclasts (cells which break down bone cells).</i>	<b>GT</b>
<b>CA1</b>	Zinc	<i>A gene that encodes a zinc-containing enzyme which catalyses the formation and dissociation of carbonic acid from carbon dioxide and water and plays an important role in carbon dioxide transport.</i>	<b>CT</b>
<b>PPCDC</b>	Zinc	<i>A gene that encodes enzyme PPCDC and affects zinc status through effects on vitamin B5 (pantothenate) metabolism.</i>	<b>TT</b>
<b>NBDY</b>	Zinc	<i>A gene that promotes dispersal of P-body components and is likely to play a role in the mRNA decapping process.</i>	<b>CC</b>

## IMPORTANT INFLUENCES ON YOUR EATING HABITS

Gene	Analysis	Role of the gene	Genotype
<b>ADRA2A</b>	Sweet treats intake	<i>Regulates the transmission of the nervous impulse and influences our behavioural habits.</i>	<b>CG</b>
<b>NMB</b>	Hunger	<i>Involved in the regulation of feeding processes.</i>	<b>AA</b>
<b>FTO</b>	Satiety	<i>A protein involved in the development of excess body weight.</i>	<b>AT</b>
<b>SLC2A2</b>	Perception of sweet taste	<i>Regulates glucose transport and is a glucose sensor.</i>	<b>CC</b>
<b>TAS2R38</b>	Perception of bitter taste	<i>A transmembrane receptor, which determines the ability to detect bitter substances, found in the plant genus Brassica.</i>	<b>CG</b>

## THE EFFECTIVENESS OF YOUR METABOLISM

Gene	Analysis	Role of the gene	Genotype
<b>ALDH2</b>	Alcohol metabolism	<i>The enzyme involved in the metabolic pathways of the breakdown of alcohol. It is responsible for an adequate alcohol metabolism.</i>	<b>GG</b>
<b>ADH1B</b>	Alcohol metabolism	<i>The enzyme involved in the metabolism of countless substrates, such as ethanol, retinol, aliphatic alcohols, hydroxysteroid, and products of peroxidation. Its activity, therefore, determines an adequate alcohol metabolism.</i>	<b>AA</b>
<b>ADH1C_1</b>	Alcohol metabolism	<i>The enzyme involved in the metabolism of countless substrates, such as ethanol, retinol, aliphatic alcohols, hydroxysteroid, and products of peroxidation. Its activity, therefore, determines an adequate alcohol metabolism.</i>	<b>GG</b>
<b>ADH1C_2</b>	Alcohol metabolism	<i>The enzyme involved in the metabolism of countless substrates, such as ethanol, retinol, aliphatic alcohols, hydroxysteroid, and products of peroxidation. Its activity, therefore, determines an adequate alcohol metabolism.</i>	<b>CC</b>
<b>CYP1A2</b>	Caffeine metabolism	<i>The enzyme responsible for the breakdown of caffeine, aflatoxin B1 and acetaminophen. It is involved in the synthesis of cholesterol and other lipids.</i>	<b>CC</b>
<b>MCM6</b>	Lactose intolerance	<i>Gene that regulates the concentration of the enzyme lactase.</i>	<b>CC</b>
<b>DQA1</b>	Gluten intolerance	<i>This gene belongs to the HLA class II beta chain paralogs. It plays a central role in the immune system by presenting peptides derived from extracellular proteins.</i>	<b>GG</b>
<b>DQB1</b>	Gluten intolerance	<i>This gene belongs to the HLA class II beta chain paralogs. It plays a central role in the immune system by presenting peptides derived from extracellular proteins.</i>	<b>TT</b>

## LIFESTYLE HABITS

Gene	Analysis	Role of the gene	Genotype
<b>CHRNA3</b>	Nicotine addiction	<i>It is a subunit of a nicotine receptor. Nicotine receptors are ion channels in the membranes of nerve cells, which regulate the potential of neuron cell membranes. They are the receptors for the nervous transmitter acetylcholine.</i>	<b>GG</b>
<b>DRD2</b>	Alcohol addiction	<i>The receptor that inhibits the activity of adenylyl cyclase. It is involved in the processes of movement, cognition (memorisation) and learning.</i>	<b>CC</b>
<b>ERAP1</b>	Alcohol addiction	<i>Aminopeptidase, which has an important role in the metabolism of various types of peptides. One of such peptides is angiotensin II, through which it regulates blood pressure.</i>	<b>GG</b>
<b>GABRA</b>	Alcohol addiction	<i>A receptor which regulates signal transmission through the synapse in the central nervous system. It is the subunit of the chloride channel and has sites for bonding benzodiazepines, barbiturates, neurosteroids, and ethanol.</i>	<b>AA</b>
<b>TERC</b>	Biological ageing	<i>A telomerase, whose main component is TERC, is a polymerase, which maintains the length of telomeres (chromosome endings) by adding telomere repeat TTAGGG.</i>	<b>CG</b>
<b>IL6</b>	Inflammation sensitivity	<i>Interleukine-6 pro-inflammatory molecule (IL6) stimulates the immune response to training and is involved in the inflammatory repair process. It plays a role in glucose and lipid metabolism.</i>	<b>GG</b>
<b>TNF</b>	Inflammation sensitivity	<i>Pro-inflammatory molecule. Elevated levels of TNF are associated with an increase in the systemic immune response and inflammatory processes.</i>	<b>GG</b>

## LIFESTYLE HABITS

Gene	Analysis	Role of the gene	Genotype
CRP	Inflammation sensitivity	<i>C-Reactive Protein is involved in several host defense related functions. Consequently, the level of this protein in plasma increases greatly during acute phase response to infection or other inflammatory stimuli. It is often used as a marker for inflammation in blood tests.</i>	CC
IL6R	Inflammation sensitivity	<i>IL6R gene encodes a subunit of the interleukin 6 (IL6) receptor complex. Interleukin 6 is a potent pleiotropic cytokine that regulates cell growth and differentiation and plays an important role in the immune response and inflammation.</i>	AA
CLOCK	Sleep cycle	<i>A gene encoding a basic helix-loop-helix-PAS transcription factor (CLOCK) that affects both the persistence and period of circadian rhythms.</i>	TT
NPAS	Sleep cycle	<i>A gene that functions as a part of a molecular clock operative in the mammalian forebrain.</i>	AG

## YOUR GENES, DETOXIFICATION AND ANTIOXIDANTS

Gene	Analysis	Role of the gene	Genotype
CAT	Oxidative stress	<i>Catalase transforms reactive oxygen species into water and oxygen, and therefore reduces the toxic influence of hydrogen peroxide</i>	AG
NQO1	Oxidative stress	<i>Enzyme which functions as quinone reductase in connection to the conjugation of hydroquinones. It is involved in numerous detoxification pathways and biosynthetic processes, such as vitamin K-dependent glutamate carboxylation.</i>	TT
APOA5	Vitamin E	<i>Apolipoprotein A5 has an important role in the regulation of the level of chylomicrons and triglycerides in the plasma. Because vitamin E is fat-soluble, APOA5 through lipid concentration in the blood affects the vitamin E level.</i>	AC
SEPP-1_1	Selenium	<i>Functions as an antioxidant. It is responsible for selenium transport, mostly to the brain and the testicles.</i>	GG
SEPP-1_2	Selenium	<i>Functions as an antioxidant. It is responsible for selenium transport, mostly to the brain and the testicles.</i>	AG
SLC23A1	Vitamin C	<i>One of the two transporters, responsible for the absorption/distribution of dietary vitamin C in our body, involving epithelial surfaces. A variant of this gene causes reduced absorption of vitamin C and is associated with lower plasma vitamin C concentrations.</i>	CC

## SPORTS AND RECREATION IN TUNE WITH YOUR GENES

Gene	Analysis	Role of the gene	Genotype
ACTN3	Muscle structure	<i>A protein expressed in the muscles. It binds to actin and is, therefore, important for muscle contraction.</i>	CC
PPAR alpha(2)	Muscle structure	<i>Regulates the expression of genes responsible for the oxidation fatty acids in the skeletal muscles and the heart muscle.</i>	CG

## SPORTS AND RECREATION IN TUNE WITH YOUR GENES

Gene	Analysis	Role of the gene	Genotype
<b>INSIG2</b>	Strength training	A protein present in the endoplasmic reticulum, where it regulates the processing of binding protein for the sterol regulatory element.	<b>GG</b>
<b>ADRB2</b>	VO2max	$\beta$ 2 adrenergic receptor (ADRB2) is a member of the G-protein-coupled receptor superfamily and plays a pivotal role in the regulation of the cardiac, pulmonary, vascular, endocrine, and central nervous system.	<b>GG</b>
<b>PPARGC1A</b>	VO2max	PPARGC1A is a transcriptional coactivator of the PPAR family and is involved in mitochondrial biogenesis, fatty acid oxidation, glucose utilisation, thermogenesis and angiogenesis.	<b>CC</b>
<b>VEGFA</b>	VO2max	A variant in the VEGFA gene has been associated with VEGF protein expression. Several studies revealed associations of VEGFA gene polymorphisms with aerobic capacity in humans and endurance athlete status.	<b>CC</b>
<b>ACE</b>	VO2max	ACE exerts a tonic regulatory function on circulatory homeostasis, through the synthesis of vasoconstrictor angiotensin II, which also drives aldosterone synthesis and the degradation of vasodilator kinins.	<b>CC</b>
<b>PPAR alpha_2</b>	VO2max	Peroxisome proliferator-activated receptor alpha (PPAR-alpha) gene is implicated in the hypoxia-inducible factor (HIF) oxygen signalling pathway and regulation of erythropoiesis.	<b>CG</b>
<b>CAT</b>	Post-exercise recovery	Catalase breaks down hydrogen peroxide (H2O2), which production is elevated during high-intensity training. At low levels, it is involved in several chemical signalling pathways, but at high levels it is toxic to cells.	<b>AG</b>
<b>NQO1</b>	Post-exercise recovery	The enzyme functions as a quinone reductase in connection to the conjugation of hydroquinones. It is involved in numerous detoxification pathways and biosynthetic processes, such as vitamin K-dependent glutamate carboxylation.	<b>TT</b>
<b>GPX1</b>	Post-exercise recovery	Glutathione peroxidase functions in the detoxification of hydrogen peroxide and is one of the most important antioxidant enzymes in humans.	<b>CC</b>
<b>SOD2</b>	Post-exercise recovery	This gene is associated with the synthesis of superoxide dismutase, an enzyme found to be associated with the conversion of superoxide (O2-) into oxygen (O2) and hydrogen peroxide (H2O2). Superoxide dismutase is an important antioxidant which protects the cell from ionising radiation, oxidative stress and inflammatory cytokines.	<b>CT</b>
<b>IL6</b>	Inflammation	Interleukine-6 pro-inflammatory molecule (IL6) stimulates the immune response to training and is involved in the inflammatory repair process. It plays a role in glucose and lipid metabolism.	<b>GG</b>
<b>TNF</b>	Inflammation	Pro-inflammatory molecule. Elevated levels of TNF are associated with in an increase in the systemic immune response and inflammatory processes.	<b>GG</b>
<b>CRP</b>	Inflammation	C-Reactive Protein is involved in several host defense related functions. Consequently, the level of this protein in plasma increases greatly during acute phase response to infection or other inflammatory stimuli. It is often used as a marker for inflammation in blood tests.	<b>CC</b>
<b>IL6R</b>	Inflammation	IL6R gene encodes a subunit of the interleukin 6 (IL6) receptor complex. Interleukin 6 is a potent pleiotropic cytokine that regulates cell growth and differentiation and plays an important role in the immune response and inflammation.	<b>AA</b>
<b>MMP3</b>	Soft tissue injury risk	It codes for the enzyme Matrix Metalloproteinase 3, which is responsible for the breakdown of fibronectin, collagen and proteoglycans of the cartilage. As such, it is involved in wound repair and progression of atherosclerosis.	<b>AG</b>

## SPORTS AND RECREATION IN TUNE WITH YOUR GENES

Gene	Analysis	Role of the gene	Genotype
COL5A1	Soft tissue injury risk	<i>It has been shown the variant within COL5A1 gene affects our (in)flexibility (passive straight leg and a sit-and-reach measurement), which consequently affects our soft tissue injury risk.</i>	AC
COL1A1	Soft tissue injury risk	<i>COL1A1 encodes for collagen type I, a protein that strengthens and support many tissues in the body, including cartilage, bone and tendon.</i>	GG
GDF5	Soft tissue injury risk	<i>GDF5 (growth differentiation factor 5) is a member of the bone morphogenetic protein (BMP) family and the TGF-beta superfamily and can affect our soft tissue injury risk.</i>	AG
CREB1	Heart capacity	<i>CREB1 has been found to be involved in the generation of long-term cardiac memory, a process leading to adaptation of ventricular repolarisation (indexed by electrocardiographic T wave) to ventricular pacing.</i>	AG
ACE	Heart capacity	<i>ACE exerts a tonic regulatory function in circulatory homeostasis, through the synthesis of vasoconstrictor angiotensin II, which also drives aldosterone synthesis, and the degradation of vasodilator kinins.</i>	CC
IL15RA	Muscle volume gene	<i>Growth factor that is expressed in muscle and has been demonstrated to have anabolic effects, with increased levels being linked to muscle growth in various studies.</i>	CC
COMT	Warrior gene	<i>COMT is one of several enzymes that degrade dopamine, epinephrine, and norepinephrine. COMT breaks down dopamine mostly in the part of the brain responsible for higher cognitive or executive function (prefrontal cortex).</i>	GG
TRHR_1	Lean body mass	<i>TRHR encodes the thyrotropin-releasing hormone (TRH) receptor. The TRH response to TRHR is the first step in the hormonal cascade that eventually leads to the release of thyroxin, which is important in the development of skeletal muscle.</i>	AA
TRHR_2	Lean body mass	<i>TRHR encodes the thyrotropin-releasing hormone (TRH) receptor. The TRH response to TRHR is the first step in the hormonal cascade that eventually leads to the release of thyroxin, which is important in the development of skeletal muscle.</i>	CC
MCT-1	Gene for muscle fatigue	<i>A gene associated with the synthesis of MCT1, a molecule that transports lactic acid across the muscle cell membrane.</i>	AT

## CARDIOVASCULAR HEALTH

Gene	Analysis	Role of the gene	Genotype
FADS1-2-3_1	HDL, LDL cholesterol, Triglycerides	<i>The family of desaturases which incorporate double bonds into fatty acids.</i>	CC
CETP_1	HDL, LDL cholesterol	<i>A protein which collects triglycerides from VLDL and LDL, and replaces them with cholesterol esters from HDL and vice versa.</i>	GT
APOA1	HDL, LDL cholesterol, Triglycerides	<i>The main lipoprotein of HDL particles.</i>	CG
ANGPTL3	LDL cholesterol, Triglycerides	<i>A protein which, through liver receptor X, influences the level of plasma lipids.</i>	GT
GALNT2	HDL cholesterol, Triglycerides	<i>A protein responsible for the biosynthesis of oligosaccharides.</i>	GG

## CARDIOVASCULAR HEALTH

Gene	Analysis	Role of the gene	Genotype
<b>PLTP</b>	HDL cholesterol, Triglycerides	<i>A transport protein for phospholipids, which is present in the blood plasma. It transports phospholipids from lipoproteins, rich in triglycerides on HDL.</i>	<b>TT</b>
<b>MLXIPL</b>	HDL cholesterol, Triglycerides	<i>In relation to glucose, it binds and activates motifs of carbohydrate response elements (ChoRE) and motifs, responsible for the synthesis of triglycerides.</i>	<b>CC</b>
<b>TRIB1_3</b>	HDL, LDL cholesterol, Triglycerides	<i>A protein involved in the regulation of inflammation in the fatty tissue, and in obesity, induced by a high-fat content diet.</i>	<b>AT</b>
<b>PPARalpha_1</b>	HDL cholesterol	<i>Regulator of the synthesis of fatty acids, the oxidation, gluconeogenesis and ketogenesis.</i>	<b>CC</b>
<b>APOE_1</b>	HDL cholesterol, LDL cholesterol	<i>A protein essential for the breaking down of lipoproteins, rich in triglycerides.</i>	<b>GG</b>
<b>APOB_1</b>	HDL, LDL cholesterol, Triglycerides	<i>The main lipoprotein of chylomicrons and LDL particles.</i>	<b>AA</b>
<b>ABCG5/8</b>	LDL cholesterol	<i>Proteins which regulate the cell export of cholesterol. Incorrect functioning is expressed in the accumulation of sterols.</i>	<b>GT</b>
<b>LDLR</b>	LDL cholesterol	<i>A protein which binds LDL particles on the surface of cells, and enables their transport into cells.</i>	<b>GT</b>
<b>PPP1R3B</b>	HDL, LDL cholesterol	<i>Inhibits the inactivation of glycogen phosphorylase, and limits the breakdown of glycogen.</i>	<b>GG</b>
<b>ABCA1</b>	HDL, LDL cholesterol, Triglycerides	<i>A membrane transporter, which regulates the transport of cholesterol and phospholipids, and the formation of HDL.</i>	<b>AA</b>
<b>LIPC</b>	HDL cholesterol	<i>A receptor for cholesterol, phospholipids, glycerides and acyl-CoA thioesters.</i>	<b>AG</b>
<b>LCAT</b>	HDL cholesterol	<i>It esters the cholesterol, which is crucial for the transport of cholesterol.</i>	<b>GG</b>
<b>LIPG</b>	HDL cholesterol	<i>A protein, which enables the hydrolysis of HDL particles.</i>	<b>AG</b>
<b>HLA</b>	LDL cholesterol, Triglycerides	<i>It helps to differentiate between the body's own and the foreign substances.</i>	<b>CC</b>
<b>GCKR_1</b>	LDL cholesterol, Triglycerides	<i>Inhibits the activity of glucokinase, which is an important enzyme in glucose metabolism.</i>	<b>CT</b>
<b>TIMD4</b>	LDL cholesterol, Triglycerides	<i>Phosphatidylserine receptor that enhances the engulfment of apoptotic cells.</i>	<b>TT</b>
<b>IL6R</b>	LDL cholesterol	<i>The IL6R gene encodes a subunit of the interleukin 6 (IL6) receptor complex. Interleukin 6 is a potent pleiotropic cytokine that regulates cell growth and differentiation and plays an important role in the immune response.</i>	<b>CT</b>
<b>APOA5</b>	Triglycerides	<i>Apolipoprotein A5 has an important role in the regulation of the level of chylomicrons and triglycerides in the plasma.</i>	<b>AC</b>
<b>LPL</b>	HDL cholesterol, Triglycerides	<i>Lipoprotein, which eliminates fats from chylomicrons and VLDL.</i>	<b>AG</b>

## CARDIOVASCULAR HEALTH

Gene	Analysis	Role of the gene	Genotype
<b>LRP1</b>	HDL cholesterol, Triglycerides	<i>A protein involved in cellular lipid homeostasis.</i>	<b>CT</b>
<b>IRS1</b>	HDL cholesterol, Triglycerides	<i>A protein which is phosphorylated by insulin receptor tyrosine kinase.</i>	<b>CC</b>
<b>TCF7L2</b>	Blood sugar	<i>A transcription factor which is involved in the Wingless-type (Wnt) signal path through which it influences diabetes type II.</i>	<b>CC</b>
<b>SLC30A8</b>	Blood sugar	<i>The main component of zinc supply for the production of insulin, and it is involved in processes of storage in insulin-secreting beta-cells of the pancreas.</i>	<b>CC</b>
<b>G6PC2</b>	Blood sugar	<i>Catalytic subunit of an enzyme glucose-6-phosphatase, and it, therefore, important influences the blood glucose level.</i>	<b>GG</b>
<b>MTNR1B</b>	Blood sugar	<i>Receptor for melatonin, influencing circadian rhythms.</i>	<b>CC</b>
<b>DGKB</b>	Blood sugar	<i>Diacylglycerol kinase regulates the level of diacylglycerol and the secretion of insulin.</i>	<b>GG</b>
<b>GCKR</b>	Blood sugar	<i>Inhibitor of glucokinase (GCK), which regulates the first step of metabolic pathways of sugars.</i>	<b>AG</b>
<b>ADCY5</b>	Blood sugar	<i>Enzyme cyclase, responsible for the synthesis of cAMP which regulates the activity of glucagon and adrenaline.</i>	<b>AG</b>
<b>FADS1</b>	Omega-3 metabolism	<i>An enzyme encoded by this gene is involved in conversion of ALA (α-linolenic acid) omega-3 fatty acid to EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid).</i>	<b>CC</b>
<b>FADS1</b>	Omega-3 and triglycerides	<i>An enzyme encoded by this gene is involved in conversion of ALA (α-linolenic acid) omega-3 fatty acid to EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid).</i>	<b>CC</b>
<b>PCSK1</b>	Insulin sensitivity	<i>An enzyme which processes proinsulin type I, and, therefore, has an important role in regulating the biosynthesis of insulin.</i>	<b>AA</b>
<b>ADIPOQ</b>	Insulin sensitivity	<i>A gene expressed in fatty tissue. It regulates fat metabolism and sensitivity to insulin.</i>	<b>GG</b>
<b>TCF7L2</b>	Insulin sensitivity	<i>A transcription factor which is involved in the Wingless-type (Wnt) signal path through which it influences diabetes type II.</i>	<b>CC</b>
<b>ADIPOQ</b>	Adiponectin	<i>A gene expressed in fatty tissue. It regulates fat metabolism and sensitivity to insulin.</i>	<b>GG</b>
<b>CRP</b>	C-reactive protein (CRP)	<i>The protein encoded by this gene is involved in several host defence related functions based on its ability to recognize foreign pathogens and damaged cells.</i>	<b>CC</b>
<b>IL6R_1</b>	C-reactive protein (CRP)	<i>IL6R gene encodes a subunit of the interleukin 6 (IL6) receptor complex. Interleukin 6 is a potent pleiotropic cytokine that regulates cell growth and differentiation and plays an important role in the immune response.</i>	<b>CT</b>
<b>HNF1A</b>	C-reactive protein (CRP)	<i>The protein encoded by this gene is a transcription factor required for the expression of several liver-specific genes.</i>	<b>CC</b>
<b>APOE_1</b>	C-reactive protein (CRP)	<i>Protein, essential for the breaking down of lipoproteins, rich in triglycerides.</i>	<b>GG</b>

## REJUVENATION

Gene	Analysis	Role of the gene	Genotype
CAT	Skin antioxidant capacity	<i>Catalase transforms reactive oxygen species into water and oxygen, and, therefore, reduces the toxic influence of hydrogen peroxide.</i>	AG
NQO1	Skin antioxidant capacity	<i>Glutathione peroxidase functions in the detoxification of hydrogen peroxide and is one of the most important antioxidant enzymes in humans.</i>	TT
SOD2	Skin antioxidant capacity	<i>This gene is associated with the synthesis of superoxide dismutase, which is an important antioxidant which protects the cell from ionising radiation, oxidative stress and inflammatory cytokines.</i>	CT
GPX1	Skin antioxidant capacity	<i>The enzyme which functions as a quinone reductase in connection to the conjugation of hydroquinones. It is involved in numerous detoxification pathways and biosynthetic processes.</i>	CC
GLO1	Glycation protection	<i>GLO1 gene encodes an enzyme which is responsible for the protection of our cells against AGEs (advanced glycation end products).</i>	CC
GLO1	Glycation protection	<i>GLO1 gene encodes an enzyme which is responsible for the protection of our cells against AGEs (advanced glycation end products).</i>	AA
ACE2	Cellulite	<i>This gene encodes for an enzyme responsible for the conversion of angiotensin I to angiotensin II and catabolism of bradykinin. Studies have shown that circulating angiotensin II is a major regulator of fasting adipose blood flow and can therefore influence our susceptibility to cellulite development.</i>	INSINS
HIF1A	Cellulite	<i>This gene encodes the alpha subunit of HIF-1, which is a transcription factor. Activation of HIF1A impairs healthy adipose endocrine function and may in this way affect the formation of cellulite.</i>	CC
AQP3	Skin hydration	<i>A protein which acts as a glycerol transporter in the skin and plays an important role in regulating stratum corneum and epidermal glycerol content. It is involved in skin hydration, wound healing, and tumorigenesis.</i>	AA
MMP1	Skin elasticity	<i>The protein encoded by this gene belong to the enzyme family called matrix metalloproteinase. Upregulation of the MMP1 gene leads to faster dermal collagen degradation.</i>	DELINS
MMP3	Skin elasticity	<i>This gene encodes an enzyme which degrades fibronectin, laminin, collagens III, IV, IX, and X, and cartilage proteoglycans.</i>	DELINS
IL6	Skin elasticity	<i>Gene that plays a major role in cell proliferation, and collagen synthesis.</i>	GG
ELN	Skin elasticity	<i>This gene encodes for elastin, a major component of elastic fibres, which provides reversible extensibility to connective tissue. Studies have shown that mutations in the ELN gene affects its expression which results in lower amounts of elastin in our body.</i>	CC
HMCN	Stretch marks	<i>This gene encodes for elastin, a major component of elastic fibres, which provides reversible extensibility to connective tissue. Studies have shown that mutations in the ELN gene affects its expression which results in lower amounts of elastin in our body.</i>	CG
ELN	Stretch marks	<i>HMCN1 plays an important role in the organisation of hemidesmosomes in the epidermis.</i>	CC

## GLOSSARY

- **Absorption:** uptake
- **Allele:** one of the variants of genetic material on a specific location (locus) of the chromosome. An individual has a chromosome pair where there are two alleles, which can be identical or not, and this is called homozygosis or heterozygosis. Different alleles in a human population can be the reason for inherited characteristics, such as blood type or hair colour.
- **Alkaloid:** a natural substance that is found in plants and has a bitter taste.
- **Amino acid:** a basic structural unit, from which protein is built. Its formation is encoded in DNA with three sequential nucleotides, which in different combinations give different amino acids: GCU is the code for amino acid alanine, UGU for cysteine...
- **Anticarcinogenic:** prevents the development of cancer.
- **Antioxidants:** substances which protect us from oxidative stress.
- **Artery:** a blood vessel that carries blood away from the heart. The main artery is the aorta.
- **BMI:** body mass index. Body mass divided by the square of body height (kg/m<sup>2</sup>).
- **Carbohydrates:** apart from proteins and fats, it is the main macronutrient. It is the basic source of energy.
- **Caucasians:** term, generally used in scientific articles for members of the white race.
- **Cell respiration:** a basic process where energy, carbon dioxide and water are formed from glucose and oxygen.
- **Chromosome:** a stick-like form of DNA molecule, which encodes hundreds or thousands of genes. In the nucleus, there are 22 autosomal chromosome pairs and 2 sex-determining chromosomes. In addition to the molecules of DNA, there are also proteins (mostly histones) present, around which the DNA is coiled. Such coiling and further formation result in a tightly formed chromosome, which takes up less space than an uncoiled molecule.
- **Chromosome (autosomal):** a chromosome, where both of the chromosomal pairs are similar. One chromosome out of the pair is given to an individual by his father and the other chromosome from his mother.
- **Chromosome (sex):** there are X (female) and Y (male) chromosomes existing. Women have a pair of two X chromosomes (XX) and men have an X and Y chromosome (XY), from which Y is inherited only from the father. Its presence/absence determines the sex of the child.
- **Chylomicron:** it helps cholesterol in passing through the intestinal mucus, and it contains a minimal amount of cholesterol and triglycerides.
- **Cofactor:** non-protein compound, bound to a protein, and is necessary for protein's biological activity.
- **Common variant (copy) of the gene:** DNA sequence of the analysed locus, which contains a nucleotide that is more common in a population (its frequency is higher than 50 percent).
- **Complex carbohydrates:** compound carbohydrates, which are slowly digested, and energy is provided for a long time, which makes us feel satiety longer. The increase in blood sugar level is slow, and not rapid, as in simple carbohydrates.
- **Creatine phosphate:** a high-energy molecule, which is a source of energy for the muscle.
- **Detoxification:** the process of removing harmful substances.
- **Diabetes:** a chronic state in which pancreatic cells do not produce enough insulin or the body cannot effectively use the produced insulin.
- **Dimethylation:** the addition of two methyl compounds.
- **DNA:** a molecule, found in the cell nucleus, which carries the instructions for the development of an organism. Human DNA is consisted of four different nucleotides and has the form of a double-helix coil. This means that two chains of DNA, which are anti-parallel and coil around one another. Anti-parallel means that the nucleotide C is always paired with G, and A always with T.
- **Enzyme:** a protein involved in chemical processes in the body. Its purpose is to reduce the activation energy required for chemical reactions and thus facilitating their course. This enables faster conversion of substrate to product, for example, conversion of starch into glucose.



## GLOSSARY

- **Essential fats:** plant fats, necessary for our body.
- **Fats:** important constituents and an energy source, which contains twice the amount of energy of carbohydrates or proteins.
- **Fibres:** indigestible carbohydrates, which are in charge of a good digestion and the feeling of satiety. They include cellulose, lignin and pectin.
- **Free radicals:** unstable chemical substances, which harm the cell.
- **Gene:** Part of the DNA sequence that carries the information for the formation of protein. Genes are inherited from parents to their descendants and give information, which is needed for the formation and development of an organism.
- **Genetic analysis:** review, or the analysis of your genes.
- **Genetic makeup:** is a general term, which is usually a synonym for genotype, or variant of the DNA gene sequence. However, the term can refer also to the region of the genome, where the gene is not present.
- **Genetic risk:** risk for, for example, excess body weight, lack of a vitamin or a mineral, which is determined by your genes.
- **Genome:** the entire DNA which is present in the cell nucleus, and includes all the autosomal chromosomes, and both sex chromosomes.
- **Genotype:** allele variants of a gene, present in an individual. Genotype can represent all of the alleles in a cell, but mostly it is used for describing one or more genes, which together influence a certain characteristic.
- **Glycaemic index:** it indicates how much a certain food increases blood sugar (it does not consider the amount of food).
- **Glycaemic load:** it indicates how much a certain food increases blood sugar (it considers the amount of food).
- **Glycogen:** the basic structural form of glucose storage in our body.
- **Glucose:** the basic representative of carbohydrates, also called blood sugar.
- **Hydrogenised fats:** are trans fats, which are formed with heating of plant oils at high temperatures.
- **Hypothalamus:** is cherry-size part in the middle of the brain, and it is the centre of all information concerning endocrine hormones.
- **Insulin:** a hormone that regulates blood sugar level.
- **Insulin resistance:** the state of our body being irresponsive to insulin, the hormone that regulates blood sugar level.
- **Kcal:** kilocalorie, in lay terms, simply calories.
- **Lactose:** milk sugar, consisting of glucose and galactose.
- **LDL cholesterol:** harmful to our health and this is why its level should be as low as possible.
- **Lipolysis:** the process of fat metabolism.
- **Lipoprotein particles:** Bind cholesterol and transport it through the body.
- **Macronutrient:** group, consists of carbohydrates, proteins and fats (saturated, monounsaturated, polyunsaturated).
- **Metabolism:** the process of the breakdown, or formation of new substances in the body.
- **Micronutrients:** nutrients our body needs in small quantities, but are nevertheless vital to our health. This includes vitamins and minerals.
- **Monounsaturated fats:** an extremely beneficial type of fatty acids.
- **Monosaccharide:** the most basic and simple carbohydrate. For example, glucose, fructose, mannose...
- **Muscle fibres:** cells that form muscles. Their name is due to their elongated shape.
- **Mutation:** a random change in the genetic material. Deletions are mutations where nucleotides on a part of genetic material are erased (deleted), insertions, where there is an insertion of nucleotides on a part of the genetic material, and substitution, where nucleotides are replaced with other nucleotides.
- **Myoglobin:** transports and stores oxygen in muscles.

## GLOSSARY

- **Nucleotide:** the basic unit of our DNA. Each unit consists of a phosphate group, pentose (sugar with five carbons in the ring) and nitrogenous bases. Between individual nucleotides, only the nitrogenous bases differ. In human DNA there are four different nitrogenous bases (Cytosine (C), Guanine (G), Thymine (T) and Adenosine (A)) and, consequently, four different nucleotides.
- **Phenotypic features:** the composite of an organism's observable characteristics or traits, such as eye colour.
- **Polymorphism:** the presence of two or more different alleles of one gene in the population. The result of this is the presence of several phenotypes. However, a different allele has to be present in more than one percent of the population to be called polymorphism.
- **Polyunsaturated fats:** a very beneficial type of fatty acids. They include omega-3 and omega-6 fatty acids.
- **Probiotic yoghurt:** contains lactic acid bacteria, which help regulate digestion.
- **Refined:** purified, industrially processed, and it unfavourably influences our health.
- **Rare variant (copy) of a gene:** DNA sequence of the analysed locus, which contains a nucleotide that is rarer in the population (its frequency is lower than 50 percent).
- **Reactive oxygen species:** highly reactive free radicals, which contain oxygen.
- **Saturated fats:** mainly animal fats, also called "bad fats" because they are increasing cholesterol levels.
- **SNP (Single Nucleotide Polymorphism):** polymorphism at specific DNA site (locus), which occurs because of the substitution of one nucleotide with another (i.e. A -> C). It represents a variation in the genetic makeup, which differs among people. These variations can be numerous because there are approximately 10 million SNPs in the human genome. The mentioned substitutions express in phenotypical differences (illnesses, characteristics) among individual people.
- **Tannins:** a plant polyphenolic compound with a bitter taste. Tannins are notably found naturally occurring in grapes, tea leaves and oak.
- **Types of fats:** in essence, we differentiate animal saturated fats and plant mono- and polyunsaturated fats.
- **Trans fats:** known also as hydrogenated or bad fats, which are produced as a result of overheating the oil. They increase bad cholesterol and reduce the good one.
- **Triglycerides:** structural form in which our body stores fat. A high triglyceride level in the blood is not healthy and it is related to numerous medical conditions.
- **VLDL:** very low-density lipoprotein, responsible for transport of cholesterol, produced by the liver.
- **Unsaturated fats:** fats of vegetable origin, exceptions are coconut and palm oil.

## SPORTS GENETICS GLOSSARY

- **Absolute Strength:** it refers to the ability to move objects, expressed in terms of absolute weight. For example: "She can squat 80 kilos for one repetition".
- **Cardiac Output:** the amount of blood that is moving through our cardio-vascular system in a minute.
- **Cardio-vascular endurance:** a description of overall aerobic capacity, which includes central (heart, lungs, blood vessels) and peripheral (muscles) components.
- **Continuous training:** the training that involves low to moderate intensity activity without rest intervals: walking, cycling, running, swimming.
- **Endurance (strength/muscular endurance):** strength endurance is the ability to execute a high number of repetitions with a given weight or to sustain a static muscular contraction for a long period of time.
- **Explosive strength:** the ability to express strength in a very fast manner.
- **Heart Rate:** number of heart contractions per minute.
- **Hypertrophy:** the term, related to cell growth, used when talking about muscle growth or fat cells volume changes.
- **Intensity:** the level of exertion. Or, "how hard is the effort, relative to one's maximal capacity". In the endurance field, intensity usually refers to a given percent of the maximal heart rate (e.g. 70%HRmax for a moderate Intensity). In the strength training field, it is usually presented by RM (repetitions maximum).
- **Interval training:** training that combines bouts of moderate to high-intensity performance with rest periods between them. The intensity of the bouts and the recovery time should be well planned and depend on the final goal of the training.
- **Maximal strength:** the maximal weight one can lift in a given movement pattern.
- **Plyometric exercise:** the exercise that engages the so-called "short-stretching cycle". Some examples: hoops, landing to jumping transition, medicine ball drills.
- **Power:** the mechanical work (W) done in a certain period of time (t), or W/t. The units of power are "Watts". As work equals force times distance (d), or F\*d, Power turns to be Force\*Speed (d/t) or, applying to an athlete's ability and formulated in an accessible language - Power is the ability to express force in a fast manner.



## GLOSSARY

- **Prehab:** a term, used to define a set of activities that aim to take care of known intrinsic (related to a person) injury risk factors. Some of the risk factors cannot be treated by an exercise intervention, but others definitely can. Among the risk factors that can be accessed and treated by exercise are: inadequate range of motion; strength, timing and motor control deficits, asymmetry and low aerobic fitness. Usually, those Prehab interventions are prescribed after an appropriate screening procedure and are extremely personal, according to the activities the person takes part in and matching their personal characteristics. The athlete is guided to perform the set of exercises (self-myofascial release, mobility drills, stretching, strengthening, aerobics etc.) as a special warm-up routine or as an additional training session itself.
- **Rate of Perceived Exertion (RPE):** an alternative way to measure the intensity of the training effort. The person evaluates his own level of effort by grading it on the 6-20 scale (BORG scale) or 0-10 (OMNI scale). Researchers have found that a high correlation exists between the subjectively evaluated level of exertion and the scientifically measured one (%HRmax or %VO2Max).
- **Relative Strength:** it describes capability to execute Body Weight exercise (e.g. chin up, handstand push-ups...) or to move external objects, when the weight is expressed relative to his/her body weight. For example: "He can Deadlift 2 times his body weight" (2BW).
- **Resting heart rate (RHR):** the number of heart beats per minute in a seated posture, measured after a rest period. When you wake up in the morning, sit on your bed and count the heart rate (beats per minute) before you get involved in any kind of activity.
- **RM (Repetitions Maximum):** the maximal number of repetitions that may be executed with a "strict form" in a given exercise. For example, if someone's RM10 for Back Squat is 80 kg, this means that a person can lift an 80 kg barbell 10 times. RM1 refers to the maximal Intensity, (the weight that can be lifted only one time).
- **Strength:** the term is usually used to describe one's ability to apply force to external objects.
- **Stroke Volume:** the amount of blood that is pumped out from the heart to aorta with a single heart contraction.
- **Training Methods:** among the most widely used methods are continuous training and interval training. Other training methods are a variation or a combination of these two. Some forms of the methods are tempo, fartlek, HIIT, circuit training and time or volume dependent Density training (AMRAP, AFAP...).
- **Training Principles:** the principle of training designed for the achievement of the desired goals. The established principles are universal, but their applications should be adapted for the given field and person. Most of the principles are grounded in sports science and approved by time. The most well-known principles are overload principle, specificity principle, individualization principle, reversibility principle and diminishing returns principle.
- **VO2max:** the label for the maximum oxygen consumption of an individual which indicates the maximal volume of oxygen our body is able to use within one minute.
- **Volume:** the "amount of the work done". In the endurance field, it refers to the distance "covered" or to the time spent for the activity, while in the strength training field it usually means the total amount of repetitions done.
- **Weight/Resistance Training:** any type of training with an external resistance/load, aimed to develop various types of strength (maximal strength, strength endurance, explosive strength...) or to "build" muscle tissue. The volume, the intensity and the manner of exercise execution will define the main outcome of resistance training.
- **Weightlifting:** an Olympic sport event, where the athletes lift the loaded barbell from the ground to overhead in two lifting styles: Clean and Jerk technique and Snatch. The aim is to lift the highest weight possible. In CROSSFIT and in sport specific training those two lifting styles and their components (clean, jerk, hang clean, power snatch) are used for power development.

## CEREALS AND STARCHY FOODS

<i>Food (100 g)</i>	<i>Food (general portion)</i>	<i>Calories</i>	<i>Proteins</i>	<i>Carbohydrates</i>	<i>Saturated fats</i>	<i>Monounsaturated fats</i>	<i>Polyunsaturated fats</i>	<i>Cholesterol</i>	<i>B6</i>
Amaranth	half a cup	371	13,6 g	65,7 g	1,50 g	1,70 g	2,80 g	0 mg	0,6 mg
Amaranth, cooked	5 tablespoons	102	3,8 g	18,7 g	~	~	~	0 mg	0,1 mg
Barley	half a cup	352	9,9 g	77,7 g	0,20 g	0,10 g	0,60 g	0 mg	0,3 mg
Barley flakes or flour	3 tablespoons	345	10,5 g	74,5 g	0,30 g	0,20 g	0,80 g	0 mg	0,4 mg
Barley, cooked	5 tablespoons	123	2,3 g	28,2 g	0,10 g	0,10 g	0,20 g	0 mg	0,1 mg
Bread, buckwheat	2 pieces	256	7,9 g	51,4 g	0,34 g	0,62 g	0,50 g	0 mg	0,3 mg
Bread, corn	2 pieces	314	7,2 g	48,1 g	2,70 g	5,10 g	1,20 g	0 mg	0,1 mg
Bread, oat	2 pieces	236	10,4 g	39,8 g	0,70 g	1,60 g	1,70 g	0 mg	0,1 mg
Bread, rye	2 pieces	258	8,5 g	48,3 g	0,60 g	1,30 g	0,80 g	0 mg	0,1 mg
Bread, spelt	2 pieces	333	12,0 g	65,7 g	0,24 g	0,54 g	1,18 g	0 mg	0,4 mg
Bread, white	2 pieces	266	7,6 g	50,6 g	0,70 g	0,70 g	1,40 g	0 mg	0,1 mg
Coconut flakes	1 cup	456	3,1 g	51,8 g	26,40 g	1,40 g	0,20 g	0 mg	0,0 mg
Corn flakes	3/4 a cup	360	6,7 g	86,7 g	0,00 g	0,00 g	0,10 g	0 mg	1,8 mg
Corn polenta, instant	half a cup	371	8,8 g	79,6 g	0,20 g	0,30 g	0,50 g	0 mg	0,1 mg
Khorasan wheat	half a cup	337	14,7 g	70,4 g	0,20 g	0,20 g	0,60 g	0 mg	0,3 mg
Khorasan wheat, cooked	3/4 a cup	146	6,5 g	30,5 g	0,10 g	0,1 g	0,24 g	0 mg	0,1 mg
Macaroni, plain, cooked	3/4 a cup	158	5,8 g	30,9 g	0,20 g	0,10 g	0,30 g	0 mg	0,0 mg
Macaroni, whole wheat, cooked	3/4 a cup	124	5,3 g	26,5 g	0,10 g	0,10 g	0,20 g	0 mg	0,1 mg
Oat flakes	4 tablespoons	375	12,7 g	68,2 g	1,50 g	2,10 g	2,40 g	0 mg	1,6 mg
Potato, baked	1 medium potato	93	2,0 g	21,5 g	0,00 g	0,00 g	0,00 g	0 mg	0,3 mg
Potato, cooked	1 medium potato	87	1,9 g	20,1 g	0,00 g	0,00 g	0,00 g	0 mg	0,3 mg
Rice bran	1 cup	316	13,3 g	49,7 g	4,20 g	7,50 g	7,50 g	0 mg	4,1 mg
Rice, brown	half a cup	362	7,5 g	76,2 g	0,50 g	1,00 g	1,00 g	0 mg	0,5 mg
Rice, white	half a cup	360	6,6 g	79,3 g	0,20 g	0,20 g	0,20 g	0 mg	0,1 mg
Spaghetti, plain, cooked, without salt	3/4 a cup	158	5,8 g	30,9 g	0,20 g	0,10 g	0,30 g	0 mg	0,0 mg
Spaghetti, whole wheat, cooked, without salt	3/4 a cup	124	5,3 g	26,5 g	0,10 g	0,10 g	0,20 g	0 mg	0,1 mg
Spelt	5 tablespoons	338	14,6 g	71,4 g	0,40 g	0,40 g	1,30 g	0 mg	0,2 mg
Tofu	1 slice	271	17,3 g	10,5 g	2,90 g	4,50 g	11,40 g	0 mg	0,1 mg
Wheat germ	1 cup	360	23,1 g	51,8 g	1,70 g	1,40 g	6,00 g	0 mg	1,3 mg
Wheat, plain	half a cup	340	10,7 g	75,4 g	0,40 g	0,20 g	0,80 g	0 mg	0,4 mg

## NUTRITION CHARTS

### CEREALS AND STARCHY FOODS

	B9	B12	D	C	E	Iron	Potassium	Selenium	Calcium	Magnesium	Manganese	Sodium	Zinc
	82 mcg	0,0 mcg	0,0 mcg	4 mg	1,20 mg	7,6 mg	508 mg	18,7 mcg	159 mg	248 mg	3,3 mg	4 mg	2,90 mg
	22 mcg	0,0 mcg	0,0 mcg	4 mg	0,20 mg	2,1 mg	135 mg	5,5 mcg	47 mg	65 mg	0,9 mg	6 mg	0,90 mg
	23 mcg	0,0 mcg	0,0 mcg	0 mg	0,00 mg	2,5 mg	280 mg	37,7 mcg	29 mg	79 mg	1,3 mg	9 mg	2,10 mg
	8 mcg	0,0 mcg	0,0 mcg	0 mg	0,60 mg	2,7 mg	4 mg	37,7 mcg	32 mg	96 mg	1,0 mg	4 mg	2,00 mg
	16 mcg	0,0 mcg	0,0 mcg	0 mg	0,00 mg	1,3 mg	93 mg	8,6 mcg	11 mg	22 mg	0,3 mg	3 mg	0,80 mg
	43 mcg	0,0 mcg	0,0 mcg	1 mg	0,22 mg	1,3 mg	166 mg	2,5 mcg	19 mg	95 mg	1,0 mg	57 mg	~
	55 mcg	0,2 mcg	~	0 mg	~	1,9 mg	128 mg	9,9 mcg	73 mg	20 mg	0,2 mg	778 mg	0,60 mg
	81 mcg	0,0 mcg	~	0 mg	0,40 mg	3,1 mg	147 mg	30,0 mcg	65 mg	35 mg	0,8 mg	407 mg	0,90 mg
	110 mcg	0,0 mcg	~	1 mg	0,30 mg	2,8 mg	166 mg	30,9 mcg	73 mg	40 mg	0,8 mg	660 mg	1,10 mg
	64 mcg	0,0 mcg	0,0 mcg	0 mg	0,98 mg	3,4 mg	418 mg	0,2 mcg	29 mg	119 mg	0,0 mg	579 mg	2,60 mg
	111 mcg	0,0 mcg	0,0 mcg	0 mg	0,20 mg	3,7 mg	100 mg	17,3 mcg	151 mg	23 mg	0,5 mg	681 mg	0,70 mg
	3 mcg	0,0 mcg	0,0 mcg	0 mg	0,00 mg	1,5 mg	361 mg	16,1 mcg	11 mg	51 mg	1,0 mg	285 mg	~
	357 mcg	5,4 mcg	3,6 mcg	0 mg	0,30 mg	19,3 mg	117 mg	5,1 mcg	3 mg	16 mg	0,1 mg	949 mg	1 mg
	5 mcg	0,0 mcg	0,0 mcg	0 mg	~	1,0 mg	137 mg	17,0 mcg	2 mg	27 mg	0,1 mg	1 mg	~
	~	~	0,0 mcg	0 mg	0,60 mg	4,4 mg	446 mg	69,3 mcg	24 mg	134 mg	2,9 mg	6 mg	3,70mg
	12 mcg	0,0 mcg	0,0 mcg	0 mg	~	2,0 mg	220 mg	~	10 mg	56 mg	1,2 mg	6 mg	1,80 mg
	7 mcg	0,0 mcg	~	0 mg	0,10 mg	0,5 mg	44 mg	26,4 mcg	7 mg	18 mg	0,3 mg	1 mg	0,50 mg
	5 mcg	0,0 mcg	~	0 mg	0,30 mg	1,1 mg	44 mg	25,9 mcg	15 mg	30 mg	1,4 mg	3 mg	0,80 mg
	286 mcg	0,0 mcg	0,0 mcg	0 mg	0,50 mg	29,3 mg	359 mg	26,8 mcg	352 mg	138 mg	2,9 mg	258 mg	2,20 mg
	9 mcg	0,0 mcg	0,0 mcg	13 mg	0,00 mg	0,4 mg	391 mg	0,3 mcg	5 mg	25 mg	0,2 mg	5 mg	0,30 mg
	10 mcg	0,0 mcg	0,0 mcg	13 mg	0,00 mg	0,3 mg	379 mg	0,3 mcg	5 mg	33 mg	0,1 mg	4 mg	0,30 mg
	63 mcg	0,0 mcg	0,0 mcg	0 mg	4,90 mg	18,5 mg	1485 mg	15,6 mcg	57 mg	781 mg	14,2 mg	5 mg	6,00 mg
	20 mcg	0,0 mcg	0,0 mcg	0 mg	1,2 mg	1,8 mg	268 mg	23,4 mcg	33 mg	143 mg	3,7 mg	4 mg	2,00 mg
	9 mcg	0,0 mcg	0,0 mcg	0 mg	1,0 mg	0,8 mg	86 mg	15,1 mcg	9 mg	35 mg	1,1 mg	1 mg	1,10 mg
	7 mcg	0,0 mcg	0,0 mcg	0 mg	0,10 mg	1,3 mg	44 mg	26,4 mcg	7 mg	18 mg	0,3 mg	1 mg	0,50 mg
	5 mcg	0,0 mcg	0,0 mcg	0 mg	0,30 mg	1,1 mg	44 mg	25,9 mcg	15 mg	30 mg	1,4 mg	3 mg	0,80 mg
	45 mcg	0,0 mcg	~	0 mg	0,80 mg	4,4 mg	388 mg	11,7 mcg	27 mg	136 mg	3,0 mg	8 mg	3,30 mg
	27 mcg	0,0 mcg	0,0 mcg	0 mg	0,00 mg	4,9 mg	146 mg	28,5 mcg	372 mg	60 mg	1,5 mg	16 mg	2,00 mg
	281 mcg	0,0 mcg	0,0 mcg	0 mg	22,00 mg	6,3 mg	892 mg	79,2 mcg	39 mg	239 mg	13,3 mg	12 mg	12,30 mg
	41 mcg	0,0 mcg	0,0 mcg	0 mg	1,00 mg	5,4 mg	435 mg	2,1 mcg	34 mg	90 mg	3,4 mg	2 mg	2,70 mg

## NUTRITION CHARTS

### FRUITS

<i>Food (100 g)</i>	<i>Food (general portion)</i>	<i>Calories</i>	<i>Proteins</i>	<i>Carbohydrates</i>	<i>Saturated fats</i>	<i>Monounsaturated fats</i>	<i>Polyunsaturated fats</i>	<i>Cholesterol</i>	<i>B6</i>
Apple	1 small fruit	52	0,3 g	11,4 g	0,21 g	0,02 g	0,25 g	0 mg	0,0 mg
Apricots, dried	1 cup	241	3,4 g	62,6 g	0,00 g	0,10 g	0,10 g	0 mg	0,1 mg
Avocado	half of the fruit	160	2,0 g	8,5 g	2,10 g	9,80 g	1,80 g	0 mg	0,3 mg
Banana	1 fruit	89	1,1 g	22,8 g	0,10 g	0,00 g	0,10 g	0 mg	0,4 mg
Black currants	1 cup	63	1,4 g	15,4 g	0,00 g	0,10 g	0,20 g	0 mg	0,1 mg
Blueberries	1 cup	57	0,7 g	14,5 g	0,00 g	0,00 g	0,10 g	0 mg	0,1 mg
Cherry, red	2/3 cup, pitted	63	1,1 g	16,0 g	0,07 g	0,08 g	0,10 g	0 mg	0,0 mg
Cranberries, dried	2,5 cup	308	0,1 g	82,4 g	0,10 g	0,20 g	0,70 g	0 mg	0,0 mg
Figs, dried	5 figs	249	3,3 g	63,9 g	0,10 g	0,20 g	0,30 g	0 mg	0,1 mg
Grapefruit	1 small fruit	34	0,6 g	7,4 g	0,03 g	0,03 g	0,06 g	0 mg	0,0 mg
Japanese Persimmon	1 fruit	70	0,6 g	16,0 g	0,05 g	0,09 g	0,06 g	0 mg	0,1 mg
Kiwi	2 fruits	61	1,1 g	14,7 g	0,03 g	0,05 g	0,30 g	0 mg	0,1 mg
Lemon	1 fruit	29	1,1 g	9,3 g	0,13 g	0,04 g	0,10 g	0 mg	0,1 mg
Mandarin	1 medium fruit	53	0,8 g	13,3 g	0,00 g	0,10 g	0,10 g	0 mg	0,1 mg
Melons	2/3 cup	34	0,8 g	8,8 g	0,10 g	0,00 g	0,10 g	0 mg	0,1 mg
Nectarine	1 small fruit	44	1,0 g	10,6 g	0,03 g	0,09 g	0,11 g	0 mg	0,0 mg
Olives, canned	12 tablespoons	145	1,0 g	3,8 g	2,00 g	11,30 g	1,30 g	0 mg	0,0 mg
Orange	1 small fruit	39	1,0 g	8,3 g	0,03 g	0,06 g	0,08 g	0 mg	0,1 mg
Peaches	1 small fruit	39	0,9 g	9,9 g	0,00 g	0,10 g	0,10 g	0 mg	0,0 mg
Pear	half of the fruit	62	0,2 g	15,0 g	0,04 g	0,07 g	0,13 g	0 mg	0,0 mg
Pineapple	2 thin slices	54	0,5 g	13,1 g	0,02 g	0,03 g	0,08 g	0 mg	0,1 mg
Plums	3 fruits	69	0,6 g	11,4 g	0,02 g	0,05 g	0,08 g	0 mg	0,0 mg
Rasberries	2/3 cup	52	1,2 g	11,9 g	0,00 g	0,10 g	0,40 g	0 mg	0,1 mg
Redcurrants	1 cup	26	1,1 g	13,8 g	0,04 g	0,03 g	0,07 g	0 mg	0,1 mg
Strawberries	half a cup, chopped	32	0,6 g	6,9 g	0,32 g	0,06 g	0,24 g	0 mg	0,0 mg
Watermelon	2/3 cup	38	0,6 g	8,3 g	0,05 g	0,03 g	0,07 g	0 mg	0,0 mg

### VEGETABLES, LEGUMES

Artichoke	1 medium piece	47	3,3 g	10,5 g	0,00 g	0,00 g	0,10 g	0 mg	0,1 mg
Asparagus	5 big asparagus	20	2,2 g	4,0 g	0,00 g	0,00 g	0,10 g	0 mg	0,1 mg
Beet, pickled	3/4 cup	65	0,8 g	16,3 g	0,00 g	0,00 g	0,00 g	0 mg	0,1 mg
Bell pepper, green	1 medium size	20	0,9 g	4,6 g	0,10 g	0,00 g	0,10 g	0 mg	0,2 mg

## NUTRITION CHARTS

### FRUITS

	<i>B9</i>	<i>B12</i>	<i>D</i>	<i>C</i>	<i>E</i>	<i>Iron</i>	<i>Potassium</i>	<i>Selenium</i>	<i>Calcium</i>	<i>Magnesium</i>	<i>Manganese</i>	<i>Sodium</i>	<i>Zinc</i>
	3 mcg	0,0 mcg	0,0 mcg	5 mg	0,20 mg	0,1 mg	107 mg	0,0 mcg	6 mg	5 mg	0,0 mg	1 mg	0,00 mg
	10 mcg	0,0 mcg	0,0 mcg	1 mg	4,30 mg	2,7 mg	1162 mg	2,2 mcg	55 mg	32 mg	0,2 mg	10 mg	0,29 mg
	81 mcg	0,0 mcg	0,0 mcg	10 mg	2,10 mg	0,5 mg	485 mg	0,4 mcg	12 mg	29 mg	0,1 mg	7 mg	0,64 mg
	20 mcg	0,0 mcg	0,0 mcg	9 mg	0,10 mg	0,3 mg	358 mg	1,0 mcg	5 mg	27 mg	0,3 mg	1 mg	0,15 mg
	8,8 mcg	0,0 mcg	0,0 mcg	181 mg	1,00 mg	1,5 mg	322 mg	1,7 mcg	55 mg	24 mg	0,3 mg	2 mg	0,27 mg
	6 mcg	0,0 mcg	0,0 mcg	10 mg	0,60 mg	0,3 mg	77 mg	0,1 mcg	6 mg	6 mg	0,3 mg	1 mg	0,17 mg
	4 mcg	0,0 mcg	0,0 mcg	7 mg	0,10 mg	0,4 mg	222 mg	0,0 mcg	13 mg	11 mg	0,1 mg	0 mg	0,10 mg
	0 mcg	0,0 mcg	0,0 mcg	0 mg	1,10 mg	0,5 mg	40 mg	0,5 mcg	10 mg	5 mg	0,3 mg	3 mg	0,10 mg
	9 mcg	0,0 mcg	0,0 mcg	1 mg	0,40 mg	2,0 mg	680 mg	0,6 mcg	162 mg	1 mg	0,5 mg	10 mg	0,60 mg
	10 mcg	0,0 mcg	0,0 mcg	33 mg	0,10 mg	0,1 mg	148 mg	1,4 mcg	12 mg	9 mg	0,0 mg	0 mg	0,07 mg
	8 mcg	0,0 mcg	0,0 mcg	8 mg	0,70 mg	0,2 mg	161 mg	0,6 mcg	8 mg	9 mg	0,4 mg	1 mg	0,10 mg
	25 mcg	0,0 mcg	0,0 mcg	93 mg	1,50 mg	0,3 mg	312 mg	0,2 mcg	34 mg	17 mg	0,1 mg	3 mg	0,10 mg
	11 mcg	0,0 mcg	0,0 mcg	53 mg	0,20 mg	0,6 mg	138 mg	0,4 mcg	26 mg	8 mg	0 mcg	2 mg	0,06 mg
	16 mcg	0,0 mcg	0,0 mcg	27 mg	0,20 mg	0,2 mg	166 mg	0,1 mcg	37 mg	12 mg	0,0 mg	2 mg	0,07 mg
	21 mcg	0,0 mcg	0,0 mcg	37 mg	0,10 mg	0,2 mg	267 mg	0,4 mcg	9 mg	12 mg	0,0 mg	16 mg	0,20 mg
	5 mcg	0,0 mcg	0,0 mcg	5 mg	0,80 mg	0,3 mg	201 mg	0,0 mcg	6 mg	9 mg	0,1 mg	0 mg	0,17 mg
	3 mcg	0,0 mcg	0,0 mcg	0 mg	3,80 mg	0,5 mg	42 mg	0,9 mcg	52 mg	11 mg	0,0 mg	1556 mg	0,20 mg
	30 mcg	0,0 mcg	0,0 mcg	53 mg	0,20 mg	0,1 mg	181 mg	0,5 mcg	40 mg	10 mg	0,0 mg	0 mg	0,07 mg
	4 mcg	0,0 mcg	0,0 mcg	7 mg	0,70 mg	0,3 mg	190 mg	0,1 mcg	6 mg	9 mg	0,1 mg	0 mg	0,17 mg
	7 mcg	0,0 mcg	0,0 mcg	4 mg	0,10 mg	0,2 mg	119 mg	0,1 mcg	9 mg	7 mg	0,0 mg	1 mg	0,10 mg
	18 mcg	0,0 mcg	0,0 mcg	48 mg	0,00 mg	0,3 mg	109 mg	0,1 mcg	13 mg	12 mg	0,9 mg	1 mg	0,12 mg
	5 mcg	0,0 mcg	0,0 mcg	10 mg	0,30 mg	0,2 mg	157 mg	0,0 mcg	6 mg	7 mg	0,1 mg	0 mg	0,10 mg
	21 mcg	0,0 mcg	0,0 mcg	26 mg	0,90 mg	0,7 mg	151 mg	0,2 mcg	25 mg	22 mg	0,7 mg	1 mg	0,42 mg
	8 mcg	0,0 mcg	0,0 mcg	41 mg	0,10 mg	1,0 mg	275 mg	0,6 mcg	33 mg	13 mg	0,2 mg	1 mg	0,23 mg
	24 mcg	0,0 mcg	0,0 mcg	59 mg	0,30 mg	0,4 mg	153 mg	0,4 mcg	16 mg	13 mg	0,4 mg	1 mg	0,14 mg
	3 mcg	0,0 mcg	0,0 mcg	8 mg	0,10 mg	0,2 mg	112 mg	0,4 mcg	7 mg	10 mg	0,0 mg	1 mg	0,10 mg

### VEGETABLES, LEGUMES

	68 mcg	0,0 mcg	0,0 mcg	12 mg	0,20 mg	1,3 mg	370 mg	0,2 mcg	44 mg	60 mg	0,3 mg	94 mg	0,40 mg
	52 mcg	0,0 mcg	0,0 mcg	6 mg	1,10 mg	2,1 mg	202 mg	2,3 mcg	24 mg	14 mg	0,2 mg	2 mg	0,54 mg
	27 mcg	0,0 mcg	0,0 mcg	2 mg	0,10 mg	0,4 mg	148 mg	1,0 mcg	11 mg	15 mg	0,2 mg	264 mg	0,30 mg
	10 mcg	0,0 mcg	0,0 mcg	80 mg	0,40 mg	0,3 mg	175 mg	0,0 mcg	10 mg	10 mg	0,1 mg	3 mg	0,13 mg

**VEGETABLES, LEGUMES**

<i>Food (100 g)</i>	<i>Food (general portion)</i>	<i>Calories</i>	<i>Proteins</i>	<i>Carbohydrates</i>	<i>Saturated fats</i>	<i>Monounsaturated fats</i>	<i>Polyunsaturated fats</i>	<i>Cholesterol</i>	<i>B6</i>
Bell pepper, red	half of a large bell pepper	31	1,0 g	6,3 g	0,00 g	0,00 g	0,10 g	0 mg	0,3 mg
Broccoli	1 cup, cubes	34	2,8 g	6,6 g	0,00 g	0,00 g	0,00 g	0 mg	0,2 mg
Cabbage, sour	1 cup	12	1,5 g	0,8 g	0,03 g	0,01 g	0,07 g	0 mg	0,2 mg
Cabbage, white, fresh	1 cup	25	1,3 g	5,8 g	0,00 g	0,00 g	0,00 g	0 mg	0,1 mg
Carrot	1 small carrot	41	0,9 g	9,6 g	0,00 g	0,00 g	0,10 g	0 mg	0,1 mg
Cauliflower	1 cup, cubes	25	2,0 g	5,3 g	0,00 g	0,00 g	0,00 g	0 mg	0,2 mg
Chard	2 leaves	19	1,8 g	3,7 g	0,00 g	0,00 g	0,10 g	0 mg	0,1 mg
Chick peas, cooked	half a cup	164	8,9 g	27,4 g	0,30 g	0,60 g	1,20 g	0 mg	0,1 mg
Dandelion	2 cups	45	2,7 g	9,2 g	0,20 g	0,00 g	0,30 g	0 mg	0,3 mg
Fennel	1 cup, cubes	31	1,2 g	7,3 g	0,09 g	0,07 g	0,17 g	0 mg	0,0 mg
Field beans, cooked	2/3 cup	110	7,6 g	19,7 g	0,10 g	0,10 g	0,20 g	0 mg	0,1 mg
Garlic	1 cup	149	6,4 g	33,1 g	0,10 g	0,00 g	0,20 g	0 mg	1,2 mg
Green kohlrabi, cooked	half a cup, sliced	29	1,8 g	6,7 g	0,00 g	0,00 g	0,10 g	0 mg	0,2 mg
Kale	1 cup	50	3,3 g	10,0 g	0,10 g	0,10 g	0,30 g	0 mg	0,3 mg
Kale, bud	1 cup	43	3,4 g	9,0 g	0,10 g	0,00 g	0,20 g	0 mg	0,2 mg
Kidney beans, cooked	half a cup	127	8,7 g	22,8 g	0,10 g	0,00 g	0,30 g	0 mg	0,1 mg
Kohlrabi	half a tuber	27	1,7 g	6,2 g	0,00 g	0,00 g	0,00 g	0 mg	0,2 mg
Lamb's lettuce	1 cup	21	2,0 g	3,6 g	0,02 g	0,01 g	0,08 g	0 mg	0,3 mg
Leek	1 cup	61	1,5 g	14,2 g	0,00 g	0,00 g	0,20 g	0 mg	0,2 mg
Lentils, cooked	half a cup	116	9,0 g	20,1 g	0,10 g	0,10 g	0,20 g	0 mg	0,2 mg
Parsley, green	10 shoots	36	3,0 g	6,3 g	0,10 g	0,30 g	0,10 g	0 mg	0,1 mg
Parsnips, cooked	1 cup	71	1,3 g	17,0 g	0,10 g	0,10 g	0,00 g	0 mg	0,1 mg
Peas, cooked	half a cup	40	3,3 g	6,8 g	0,00 g	0,00 g	0,10 g	0 mg	0,1 mg
Radish	1 ½ cups, sliced	16	0,7 g	3,5 g	0,00 g	0,00 g	0,00 g	0 mg	0,1 mg
Red cabbage	1 ½ cup, grated	31	1,4 g	7,4 g	0,00 g	0,00 g	0,10 g	0 mg	0,2 mg
Soy milk	half a cup	45	2,9 g	3,5 g	0,20 g	0,40 g	1,20 g	0 mg	0,2 mg
Soy yogurt	1 cup	94	3,5 g	9,7 g	0,26 g	0,40 g	1,02 g	0 mg	0,0 mg
Soy, cooked	half a cup	141	12,3 g	11,1 g	0,70 g	1,20 g	3,00 g	0 mg	0,1 mg
Spinach, cooked	half a cup	23	3,0 g	3,7 g	0,00 g	0,00 g	0,10 g	0 mg	0,2 mg
Spring onion	1 cup, cubes	32	1,8 g	7,3 g	0,00 g	0,00 g	0,10 g	0 mg	0,1 mg
Tomato	half of a large tomato	18	0,9 g	3,9 g	0,00 g	0,00 g	0,10 g	0 mg	0,1 mg
Turnip	2 cups	28	0,9 g	6,4 g	0,00 g	0,00 g	0,10 g	0 mg	0,1 mg

## NUTRITION CHARTS

### VEGETABLES, LEGUMES

	<i>B9</i>	<i>B12</i>	<i>D</i>	<i>C</i>	<i>E</i>	<i>Iron</i>	<i>Potassium</i>	<i>Selenium</i>	<i>Calcium</i>	<i>Magnesium</i>	<i>Manganese</i>	<i>Sodium</i>	<i>Zinc</i>
	46 mcg	0,0 mcg	0,0 mcg	128 mg	1,60 mg	0,4 mg	211 mg	0,1 mcg	7 mg	12 mg	0,1 mg	4 mg	0,30 mg
	63 mcg	0,0 mcg	0,0 mcg	89 mg	0,80 mg	0,7 mg	316 mg	2,5 mcg	47 mg	21 mg	0,2 mg	33 mg	0,40 mg
	31 mcg	0,0 mcg	0,0 mcg	20 mg	0,14 mg	0,6 mg	288 mg	0,6 mcg	48 mg	14 mg	0,1 mg	355 mg	0,00 mg
	43 mcg	0,0 mcg	0,0 mcg	37 mg	0,20 mg	0,5 mg	170 mg	0,3 mcg	40 mg	12 mg	0,2 mg	18 mg	0,20 mg
	19 mcg	0,0 mcg	0,0 mcg	6 mg	0,70 mg	0,3 mg	320 mg	0,1 mcg	33 mg	12 mg	0,1 mg	69 mg	0,20 mg
	57 mcg	0,0 mcg	0,0 mcg	46 mg	0,10 mg	0,4 mg	303 mg	0,6 mcg	22 mg	15 mg	0,2 mg	30 mg	0,30 mg
	14 mcg	0,0 mcg	0,0 mcg	30 mg	1,90 mg	1,8 mg	379 mg	0,9 mcg	51 mg	81 mg	0,4 mg	213 mg	0,40 mg
	172 mcg	0,0 mcg	0,0 mcg	1 mg	0,40 mg	2,9 mg	291 mg	3,7 mcg	49 mg	48 mg	1,0 mg	7 mg	1,53 mg
	27 mcg	0,0 mcg	0,0 mcg	35 mg	3,40 mg	3,1 mg	397 mg	0,5 mcg	187 mg	36 mg	0,3 mg	76 mg	0,40 mg
	27 mcg	0,0 mcg	0,0 mcg	12 mg	0,58 mg	0,7 mg	414 mg	0,7 mcg	49 mg	17 mg	0,2 mg	52 mg	0,20 mg
	104 mcg	0,0 mcg	0,0 mcg	0 mg	0,00 mg	1,5 mg	268 mg	2,6 mcg	36 mg	43 mg	0,4 mg	5 mg	0,38 mg
	3 mcg	0,0 mcg	0,0 mcg	31 mg	0,10 mg	1,7 mg	401 mg	14,2 mcg	181 mg	25 mg	1,7 mg	17 mg	1,20 mg
	12 mcg	0,0 mcg	0,0 mcg	54 mg	0,50 mg	0,4 mg	340 mg	0,8 mcg	25 mg	19 mg	0,1 mg	21 mg	0,03 mg
	29 mcg	0,0 mcg	0,0 mcg	120 mg	0,88 mg	1,7 mg	447 mg	0,9 mcg	135 mg	34 mg	0,8 mg	43 mg	0,60 mg
	61 mcg	0,0 mcg	0,0 mcg	85 mg	0,90 mg	1,4 mg	389 mg	1,6 mcg	42 mg	23 mg	0,3 mg	25 mg	~
	130 mcg	0,0 mcg	0,0 mcg	1 mg	0,00 mg	2,2 mg	405 mg	1,1 mcg	35 mg	42 mg	0,4 mg	1 mg	1,10 mg
	16 mcg	0,0 mcg	0,0 mcg	62 mg	0,50 mg	0,4 mg	350 mg	0,7 mcg	24 mg	19 mg	0,1 mg	20 mg	0,00 mg
	14 mcg	0,0 mcg	0,0 mcg	38 mg	0,22 mg	2,2 mg	459 mg	0,9 mcg	38 mg	13 mg	0,4 mg	4 mg	~
	64 mcg	0,0 mcg	0,0 mcg	12 mg	0,90 mg	2,1 mg	180 mg	1,0 mcg	59 mg	28 mg	0,5 mg	20 mg	0,10 mg
	181 mcg	0,0 mcg	0,0 mcg	2 mg	0,10 mg	3,3 mg	369 mg	2,8 mcg	19 mg	36 mg	0,5 mg	2 mg	1,60 mg
	152 mcg	0,0 mcg	0,0 mcg	133 mg	0,70 mg	6,2 mg	554 mg	0,1 mcg	138 mg	50 mg	0,2 mg	56 mg	1,10 mg
	58 mcg	0,0 mcg	0,0 mcg	13 mg	1,00 mg	0,6 mg	367 mg	1,7 mcg	37 mg	29 mg	0,3 mg	10 mg	0,30 mg
	29 mcg	0,0 mcg	0,0 mcg	48 mg	0,40 mg	2,0 mg	240 mg	0,7 mcg	42 mg	26 mg	0,2 mg	240 mg	1,64 mg
	25 mcg	0,0 mcg	0,0 mcg	15 mg	0,00 mg	0,3 mg	233 mg	0,6 mcg	25 mg	10 mg	0,1 mg	39 mg	0,30 mg
	18 mcg	0,0 mcg	0,0 mcg	57 mg	0,10 mg	0,8 mg	243 mg	0,6 mcg	45 mg	16 mg	0,2 mg	27 mg	0,20 mg
	32 mcg	1,1 mcg	12,0 mcg	7 mg	2,50 mg	0,5 mg	141 mg	2,3 mcg	140 mg	10 mg	~	50 mg	~
	6 mcg	~	1,3 mcg	13 mg	0,31 mg	1,06 mg	0 mg	13,0 mcg	118 mg	40 mg	~	13 mg	~
	111 mcg	0,0 mcg	0,0 mcg	17 mg	0,21 mg	2,5 mg	539 mg	1,4 mcg	145 mg	60 mg	0,5 mg	14 mg	0,90 mg
	146 mcg	0,0 mcg	0,0 mcg	10 mg	2,10 mg	3,6 mg	466 mg	0,5 mcg	136 mg	87 mg	0,9 mg	70 mg	0,80 mg
	64 mcg	0,0 mcg	0,0 mcg	19 mg	0,50 mg	1,5 mg	276 mg	0,6 mcg	72 mg	20 mg	0,2 mg	16 mg	0,40 mg
	15 mcg	0,0 mcg	0,0 mcg	13 mg	0,50 mg	0,3 mg	237 mg	0,0 mcg	10 mg	11 mg	0,1 mg	5 mg	0,10 mg
	15 mcg	0,0 mcg	0,0 mcg	21 mg	0,00 mg	0,3 mg	191 mg	0,7 mcg	30 mg	11 mg	0,1 mg	67 mg	0,30 mg

## NUTS AND SEEDS

<i>Food (100 g)</i>	<i>Food (general portion)</i>	<i>Calories</i>	<i>Proteins</i>	<i>Carbohydrates</i>	<i>Saturated fats</i>	<i>Monounsaturated fats</i>	<i>Polyunsaturated fats</i>	<i>Cholesterol</i>	<i>B6</i>
Almonds	1 cup	575	21,2 g	21,7 g	3,70 g	30,90 g	12,10 g	0 mg	0,1 mg
Brazil nuts	7 tablespoons	656	14,3 g	12,3 g	15,10 g	24,60 g	20,60 g	0 mg	0,1 mg
Cashews	7 tablespoons	587	17,6 g	27,6 g	9,80 g	29,10 g	8,40 g	0 mg	0,3 mg
Chestnuts, cooked	1 cup	131	2,0 g	27,8 g	0,30 g	0,50 g	0,50 g	0 mg	0,2 mg
Hazelnuts	10 tablespoons	628	15,0 g	16,7 g	4,50 g	45,70 g	7,90 g	0 mg	0,6 mg
Macadamia	3/4 cup	718	7,9 g	14,2 g	12,10 g	58,90 g	1,50 g	0 mg	0,3 mg
Peanuts	7 tablespoons	567	25,8 g	16,1 g	6,80 g	24,40 g	15,60 g	0 mg	0,3 mg
Pine nuts	3/4 cup	673	13,7 g	13,1 g	4,90 g	18,76 g	34,07 g	0 mg	0,1 mg
Pistachios	3/4 cup	557	20,6 g	28,0 g	5,40 g	23,30 g	13,50 g	0 mg	1,7 mg
Poppy seeds	11 teaspoons	525	18,0 g	28,1 g	4,50 g	6,00 g	28,60 g	0 mg	0,2 mg
Pumpkin seeds, dried	10 teaspoons	541	24,5 g	17,8 g	8,70 g	14,30 g	20,90 g	0 mg	0,2 mg
Sesame seeds	11 teapoons	631	20,5 g	12,1 g	9,10 g	23,90 g	25,50 g	0 mg	0,4 mg
Walnuts	1 cup	654	15,2 g	13,7 g	6,10 g	8,90 g	47,20 g	0 mg	0,5 mg

## FISH AND SEAFOOD

Anchovies	1 fillet	131	20,4 g	0,0 g	1,30 g	1,20 g	1,60 g	60 mg	0,1 mg
Brown trout, farmed	1 fillet	148	20,8 g	0,0 g	1,10 g	3,30 g	1,50 g	58 mg	0,2 mg
Cod	1 fillet	82	17,8 g	0,0 g	0,10 g	0,10 g	0,20 g	43 mg	0,2 mg
Eel, cooked	1 small fillet	236	23,7 g	0,0 g	3,00 g	9,20 g	1,20 g	161 mg	0,1 mg
Gray mullet	1 fillet	117	19,4 g	0,0 g	1,10 g	1,10 g	0,70 g	49 mg	0,4 mg
Hake	1 fillet	82	17,9 g	0,0 g	0,10 g	0,10 g	0,20 g	37 mg	0,4 mg
Herring	100 g	158	18,0 g	0,0 g	2,00 g	3,70 g	2,10 g	60 mg	0,3 mg
Lobster	half a lobster	90	18,8 g	0,5 g	0,20 g	0,30 g	0,20 g	95 mg	0,1 mg
Mackerel	1 small fillet	205	18,6 g	0,0 g	3,30 g	5,50 g	3,30 g	70 mg	0,4 mg
Mussels, cooked	2 cup	172	23,8 g	7,4 g	0,90 g	1,00 g	1,20 g	56 mg	0,1 mg
Octopus	100 g	82	14,9 g	2,2 g	0,20 g	0,20 g	0,20 g	48 mg	0,4 mg
Salmon	1 small fillet	208	20,4 g	0,0 g	3,00 g	3,80 g	3,90 g	55 mg	0,6 mg
Sardines	2 Fish	117	19,7 g	0,0 g	0,82 g	0,44 g	1,15 g	81 mg	~
Sardines, canned	2 Fish	208	24,6 g	0,0 g	1,50 g	3,90 g	5,10 g	142 mg	0,2 mg
Seabass	1 fillet	97	18,4 g	0,0 g	0,50 g	0,40 g	0,70 g	41 mg	0,4 mg
Squid, fried	1 cup	175	17,9 g	7,8 g	1,90 g	2,70 g	2,10 g	260 mg	0,1 mg
Tuna in its own juice	100 g	128	23,6 g	0,0 g	0,80 g	0,80 g	1,10 g	42 mg	0,2 mg
Tuna, ordinary	1 small fillet	108	23,4 g	0,0 g	0,20 g	0,20 g	0,30 g	45 mg	0,9 mg

## NUTRITION CHARTS

### NUTS AND SEEDS

B9	B12	D	C	E	Iron	Potassium	Selenium	Calcium	Magnezij	Manganese	Sodium	Zinc
50 mcg	0,0 mcg	0,0 mcg	0 mg	26,20 mg	3,7 mg	705 mg	2,5 mcg	264 mg	268 mg	2,3 mg	1 mg	3,10 mg
22 mcg	0,0 mcg	0,0 mcg	1 mg	5,70 mg	2,4 mg	659 mg	1917,0 mcg	160 mg	376 mg	1,2 mg	3 mg	4,10 mg
68 mcg	0,0 mcg	0,0 mcg	0 mg	0,90 mg	5,0 mg	546 mg	11,5 mcg	43 mg	258 mg	0,8 mg	15 mg	5,80 mg
38 mcg	0,0 mcg	0,0 mcg	27 mg	0,50 mg	1,7 mg	715 mg	0,9 mcg	46 mg	54 mg	0,5 mg	27 mg	0,30 mg
113 mcg	0,0 mcg	0,0 mcg	6 mg	15,00 mg	4,7 mg	680 mg	2,4 mcg	114 mg	163 mg	6,2 mg	0 mg	2,50 mg
11 mcg	0,0 mcg	0,0 mcg	1 mg	0,50 mg	3,7 mg	368 mg	3,6 mcg	85 mg	130 mg	4,1 mg	5 mg	1,30 mg
240 mcg	0,0 mcg	0,0 mcg	0 mg	8,30 mg	4,6 mg	705 mg	7,2 mcg	92 mg	168 mg	1,9 mg	18 mg	2,10 mg
34 mcg	0,0 mcg	0,0 mcg	1 mg	9,30 mg	5,5 mg	597 mg	0,7 mcg	16 mg	251 mg	8,8 mg	2 mg	6,50 mg
51 mcg	0,0 mcg	0,0 mcg	1 mg	2,30 mg	4,2 mg	1025 mg	7,0 mcg	107 mg	121 mg	1,2 mg	1 mg	2,20 mg
82 mcg	0,0 mcg	0,0 mcg	1 mg	1,80 mg	9,8 mg	719 mg	13,5 mcg	1438 mg	347 mg	6,7 mg	26 mg	7,90 mg
58 mcg	0,0 mcg	0,0 mcg	2 mg	0,00 mg	15,0 mg	807 mg	5,6 mcg	43 mg	535 mg	3,0 mg	18 mg	7,80 mg
115 mcg	0,0 mcg	0,0 mcg	0 mg	1,70 mg	6,4 mg	370 mg	97,5 mcg	600 mg	345 mg	1,4 mg	47 mg	6,70 mg
98 mcg	0,0 mcg	0,0 mcg	1 mg	0,70 mg	2,9 mg	441 mg	4,9 mcg	98 mg	158 mg	3,4 mg	2 mg	3,10 mg

### FISH AND SEAFOOD

9 mcg	0,6 mcg	1,7 mcg	0 mg	0,60 mg	3,3 mg	383 mg	36,5 mcg	147 mg	41 mg	0,1 mg	104 mg	1,70 mg
13 mcg	7,8 mcg	3,9 mcg	1 mg	0,20 mg	1,5 mg	361 mg	12,6 mcg	43 mg	22 mg	0,9 mg	52 mg	0,50 mg
7 mcg	0,9 mcg	1,1 mcg	1 mg	0,60 mg	0,4 mg	413 mg	33,1 mcg	16 mg	32 mg	0,0 mg	54 mg	0,50 mg
17 mcg	2,9 mcg	23,3 mcg	2 mg	4,00 mg	0,6 mg	349 mg	90,0 mcg	26 mg	26 mg	0,0 mg	65 mg	2,10 mg
9 mcg	0,2 mcg	18,3 mcg	1 mg	1,00 mg	1,0 mg	357 mg	149,0 mcg	41 mg	29 mg	0,0 mg	65 mg	0,50 mg
7 mcg	0,9 mcg	4,2 mcg	3 mg	0,60 mg	0,3 mg	403 mg	36,5 mcg	7 mg	24 mg	0,0 mg	71 mg	0,50 mg
10 mcg	13,7 mcg	1,0 mcg	1 mg	1,10 mg	1,1 mg	327 mg	36,5 mcg	57 mg	32 mg	0,0 mg	90 mg	1,00 mg
9 mcg	0,9 mcg	0,0 mcg	0 mg	1,50 mg	0,3 mg	275 mg	41,4 mcg	48 mg	27 mg	0,1 mg	296 mg	4,10 mg
1 mcg	8,7 mcg	9,0 mcg	1 mg	1,50 mg	1,6 mg	314 mg	44,1 mcg	12 mg	76 mg	0,0 mg	90 mg	0,60 mg
76 mcg	24,0 mcg	0,0 mcg	14 mg	0,55 mg	6,7 mg	268 mg	89,6 mcg	33 mg	37 mg	6,8 mg	369 mg	2,70 mg
16 mcg	20,0 mcg	0,0 mcg	5 mg	1,20 mg	5,3 mg	350 mg	44,8 mcg	53 mg	30 mg	0,0 mg	230 mg	1,70 mg
26 mcg	3,2 mcg	16,0 mcg	4 mg	3,60 mg	0,3 mg	363 mg	24,0 mcg	9 mg	27 mg	0,0 mg	59 mg	0,40 mg
~	~	~	~	0,00 mg	2,7 mg	474 mg	640,6 mcg	379 mg	40 mg	0,2 mg	59 mg	~
12 mcg	8,9 mcg	6,8 mcg	0 mg	2,00 mg	2,9 mg	397 mg	52,7 mcg	382 mg	39 mg	0,1 mg	505 mg	1,30 mg
5 mcg	0,3 mcg	67,8 mcg	0 mg	0,50 mg	0,3 mg	256 mg	36,5 mcg	10 mg	41 mg	0,0 mg	68 mg	0,40 mg
14 mcg	1,2 mcg	0,0 mcg	4 mg	1,20 mg	1,0 mg	279 mg	51,8 mcg	39 mg	38 mg	0,1 mg	306 mg	1,70 mg
2 mcg	1,2 mcg	4,5 mcg	0 mg	0,90 mg	1,0 mg	237 mg	65,7 mcg	14 mg	33 mg	0,0 mg	377 mg	0,50 mg
2 mcg	0,5 mcg	4,5 mcg	1 mg	0,50 mg	0,7 mg	444 mg	36,5 mcg	16 mg	50 mg	0,0 mg	37 mg	0,40 mg

## MILK AND DAIRY PRODUCTS

<i>Food (100 g)</i>	<i>Food (general portion)</i>	<i>Calories</i>	<i>Proteins</i>	<i>Carbohydrates</i>	<i>Saturated fats</i>	<i>Monounsaturated fats</i>	<i>Polyunsaturated fats</i>	<i>Cholesterol</i>	<i>B6</i>
Butter, raw	7 tablespoon	717	0,9 g	0,1 g	51,40 g	21,00 g	3,00 g	215 mg	0,0 mg
Buttermilk	half a cup	56	4,1 g	5,3 g	1,20 g	0,60 g	0,10 g	8 mg	0,1 mg
Curd, 20% m.m.	8 tablespoons	109	12,5 g	2,7 g	2,76 g	0,15 g	0,03 g	17 mg	0,1 mg
Curd, 40% m.m.	8 tablespoons	160	11,1 g	2,6 g	6,17 g	0,34 g	0,07 g	37 mg	0,1 mg
Curd, skimmed	8 tablespoons	70	13,5 g	3,2 g	0,17 g	0,08 g	0,00 g	1 mg	0,1 mg
Edamer cheese	100 g	357	25,0 g	1,4 g	17,60 g	8,10 g	0,70 g	89 mg	0,1 mg
Gauda cheese	100 g	356	24,9 g	2,2 g	17,60 g	7,70 g	0,70 g	114 mg	0,1 mg
Kefir 1,1%	half a cup	41	3,1 g	4,6 g	0,57 g	0,00 g	0,00 g	0 mg	0,1 mg
Margarine, regular	7 tablespoon	713	0,2 g	0,7 g	14,20 g	36,40 g	26,70 g	0 mg	0,0 mg
Margarine, vegetable	7 tablespoon	526	0,6 g	0,0 g	10,00 g	20,30 g	24,70 g	1 mg	0,0 mg
Mozzarella	100 g	300	22,2 g	2,2 g	13,20 g	6,60 g	0,80 g	79 mg	0,1 mg
Pasteurized milk 1,6%	half a cup	46	3,0 g	4,8 g	0,91 g	0,41 g	0,04 g	5 mg	0,1 mg
Pasteurized whole milk	half a cup	60	3,2 g	5,3 g	1,90 g	0,80 g	0,20 g	10 mg	0,1 mg
Ricotta cheese	100 g	174	11,3 g	0,3 g	8,30 g	3,60 g	0,40 g	51 mg	0,0 mg
Sour cream	8 tablespoons	193	2,1 g	3,5 g	11,50 g	5,10 g	0,80 g	52 mg	0,1 mg
Trappist cheese	100 g	358	26,6 g	0,0 g	17,38 g	0,42 g	0,20 g	0 mg	0,0 mg

## OILS

Avocado oil	7 tablespoons	884	0,0 g	0,0 g	11,60 g	70,60 g	13,50 g	~	0,0 mg
Butter, cashew nuts	6 tablespoons	587	17,6 g	27,6 g	9,80 g	29,10 g	8,40 g	0 mg	0,3 mg
Butter, peanut	6 tablespoons	588	25,1 g	20,0 g	10,50 g	24,20 g	14,20 g	0 mg	0,5 mg
Coconut oil	7 tablespoons	862	0,0 g	0,0 g	86,50 g	5,80 g	1,80 g	0 mg	0,0 mg
Fish oil, sardine	7 tablespoons	902	0,0 g	0,0 g	29,90 g	33,80 g	31,90 g	710 mg	0,0 mg
Linseed oil	7 tablespoons	884	0,0 g	0,0 g	9,40 g	20,20 g	66,00 g	0 mg	0,0 mg
Mustard oil	7 tablespoons	884	0,0 g	0,0 g	11,60 g	59,20 g	21,20 g	~	0,0 mg
Olive oil	7 tablespoons	884	0,0 g	0,0 g	13,80 g	73,00 g	10,50 g	0 mg	0,0 mg
Palm oil	7 tablespoons	884	0,0 g	0,0 g	49,30 g	37,00 g	9,30 g	0 mg	0,0 mg
Pumpkin seed oil	7 tablespoons	884	0,0 g	0,0 g	16,63 g	13,32 g	9,01 g	0 mg	0,0 mg
Rapeseed oil	7 tablespoons	884	0,0 g	0,0 g	7,40 g	63,30 g	28,10 g	0 mg	0,0 mg
Sunflower oil, refined	7 tablespoons	884	0,0 g	0,0 g	13,00 g	46,20 g	36,40 g	0 mg	0,0 mg
Walnut oil	7 tablespoons	884	0,0 g	0,0 g	9,10 g	22,80 g	63,30 g	0 mg	0,0 mg
Wheat germ oil	7 tablespoons	884	0,0 g	0,0 g	18,80 g	15,10 g	61,70 g	0 mg	0,0 mg

## NUTRITION CHARTS

### MILK AND DAIRY PRODUCTS

<i>B9</i>	<i>B12</i>	<i>D</i>	<i>C</i>	<i>E</i>	<i>Iron</i>	<i>Potassium</i>	<i>Selenium</i>	<i>Calcium</i>	<i>Magnesium</i>	<i>Manganese</i>	<i>Sodium</i>	<i>Zinc</i>
3 mcg	0,2 mcg	1,4 mcg	0 mg	2,30 mg	0,0 mg	24 mg	1,0 mcg	24 mg	2 mg	0,0 mg	576 mg	0,10 mg
6 mcg	0,4 mcg	0,3 mcg	2 mg	0,10 mg	0,1 mg	180 mg	2,3 mcg	143 mg	13 mg	0,0 mg	86 mg	0,20 mg
16 mcg	0,8 mcg	0,1 mcg	1 mg	0,12 mg	0,4 mg	87 mg	5,0 mcg	85 mg	11 mg	0,1 mg	35 mg	0,50 mg
28 mcg	0,7 mcg	0,2 mcg	1 mg	0,27 mg	0,3 mg	82 mg	0,0 mcg	95 mg	10 mg	0,1 mg	34 mg	0,69 mg
16 mcg	0,9 mcg	0,0 mcg	1 mg	0,01 mg	0,4 mg	95 mg	9,4 mcg	92 mg	12 mg	0,1 mg	40 mg	0,50 mg
16 mcg	1,5 mcg	36,0 mcg	0 mg	0,20 mg	0,4 mg	188 mg	14,5 mcg	731 mg	30 mg	0,0 mg	965 mg	3,80 mg
21 mcg	1,5 mcg	1,3 mcg	0 mg	0,20 mg	0,2 mg	121 mg	14,5 mcg	700 mg	29 mg	0,0 mg	819 mg	3,90 mg
5 mcg	0,5 mcg	0,1 mcg	1 mg	0,11 mg	0,1 mg	160 mg	0,0 mcg	120 mg	14 mg	0,0 mg	38 mg	~
1 mcg	0,1 mcg	2,5 mcg	0 mg	15,40 mg	0,0 mg	17 mg	0,0 mcg	3 mg	1 mg	0,0 mg	657 mg	0,00 mg
1 mcg	0,1 mcg	2,5 mcg	0 mg	5,00 mg	0,0 mg	30 mg	0,0 mcg	21 mg	2 mg	0,0 mg	785 mg	0,00 mg
7 mcg	2,3 mcg	4,8 mcg	0 mg	0,20 mg	0,4 mg	76 mg	17,0 mcg	505 mg	20 mg	0,0 mg	627 mg	2,90 mg
4 mcg	0,4 mcg	0,0 mcg	2 mg	0,04 mg	0,0 mg	155 mg	2,5 mcg	118 mg	12 mg	0,0 mg	47 mg	0,40 mg
5 mcg	0,4 mcg	1,0 mcg	2 mg	0,10 mg	0,0 mg	143 mg	3,7 mcg	113 mg	10 mg	0,0 mg	40 mg	0,40 mg
12 mcg	0,3 mcg	3,0 mcg	0 mg	0,10 mg	0,4 mg	105 mg	14,5 mcg	207 mg	11 mg	0,0 mg	84 mg	1,20 mg
7 mcg	0,3 mcg	4,2 mcg	1 mg	0,40 mg	0,2 mg	141 mg	2,6 mcg	110 mg	10 mg	0,0 mg	80 mg	0,40 mg
3 mcg	2,1 mcg	0,0 mcg	0 mg	0,42 mg	0,3 mg	67 mg	0,0 mcg	920 mg	29 mg	0,0 mg	1 mg	~

### OILS

0 mcg	0,0 mcg	0,0 mcg	0 mg	~	0,0 mg	0 mg	0,0 mcg	0 mg	0 mg	0,0 mg	0 mg	0,00 mg
68 mcg	0,0 mcg	0,0 mcg	0 mg	0,92 mg	5,0 mg	546 mg	11,5 mcg	43 mg	258 mg	0,8 mg	15 mg	5,20 mg
74 mcg	0,0 mcg	0,0 mcg	0 mg	9,00 mg	1,9 mg	649 mg	5,6 mcg	43 mg	154 mg	1,5 mg	459 mg	2,50 mg
0 mcg	0,0 mcg	0,0 mcg	0 mg	0,10 mg	0,0 mg	0 mg	0,0 mcg	0 mg	0 mg	0,0 mg	0 mg	0,00 mg
0 mcg	0,0 mcg	99,6 mcg	0 mg	~	0,0 mg	0 mg	0,0 mcg	0 mg	0 mg	0,0 mg	0 mg	0,00 mg
0 mcg	0,0 mcg	0,0 mcg	0 mg	17,50 mg	0,0 mg	0 mg	0,0 mcg	0 mg	0 mg	~	0 mg	~
0 mcg	0,0 mcg	0,0 mcg	0 mg	~	0,0 mg	0 mg	0,0 mcg	0 mg	0 mg	0,0 mg	0 mg	0,00 mg
0 mcg	0,0 mcg	0,0 mcg	0 mg	14,30 mg	0,6 mg	1 mg	0,0 mcg	1 mg	0 mg	0,0 mg	0 mg	0,00 mg
0 mcg	0,0 mcg	0,0 mcg	0 mg	15,90 mg	0,0 mg	0 mg	0,0 mcg	0 mg	0 mg	~	0 mg	0,00 mg
0 mcg	0,0 mcg	0,0 mcg	0 mg	0,00 mg	0,0 mg	0 mg	0,0 mcg	0 mg	0 mg	0,0 mg	0 mg	~
0 mcg	0,0 mcg	0,0 mcg	0 mg	17,50 mg	0,0 mg	0 mg	0,0 mcg	0 mg	0 mg	0,0 mg	0 mg	~
0 mcg	0,0 mcg	0,0 mcg	0 mg	41,10 mg	0,0 mg	0 mg	0,0 mcg	0 mg	0 mg	0,0 mg	0 mg	0,00 mg
0 mcg	0,0 mcg	0,0 mcg	0 mg	0,40 mg	0,0 mg	0 mg	0,0 mcg	0 mg	0 mg	0,0 mg	0 mg	0,00 mg
0 mcg	0,0 mcg	0,0 mcg	0 mg	149,00 mg	0,0 mg	0 mg	0,0 mcg	0 mg	0 mg	0,0 mg	0 mg	0,00 mg

## MEAT AND REPLACEMENTS

<i>Food (100 g)</i>	<i>Food (general portion)</i>	<i>Calories</i>	<i>Proteins</i>	<i>Carbohydrates</i>	<i>Saturated fats</i>	<i>Monounsaturated fats</i>	<i>Polyunsaturated fats</i>	<i>Cholesterol</i>	<i>B6</i>
Beef, outer thigh	1 steak	192	20,7 g	0,0 g	4,50 g	5,00 g	0,40 g	58 mg	0,6 mg
Beef, upper thigh	1 steak	135	22,9 g	0,0 g	1,40 g	1,70 g	0,20 g	55 mg	0,7 mg
Chicken liver	100 g	116	16,9 g	0,0 g	1,60 g	1,20 g	1,30 g	345 mg	0,9 mg
Chicken without skin	2 thighs	119	19,7 g	0,0 g	1,00 g	1,20 g	1,00 g	83 mg	0,3 mg
Cooked ham	100 g	172	22,3 g	0,3 g	2,80 g	4,00 g	1,00 g	58 mg	0,3 mg
Deer meat	100 g	120	23,0 g	0,0 g	0,90 g	0,70 g	0,50 g	85 mg	0,4 mg
Domestic goose, without skin	half a portion	161	22,8 g	0,0 g	2,80 g	1,90 g	0,90 g	84 mg	0,6 mg
Egg, hard boiled	1 egg	155	12,6 g	1,1 g	3,30 g	4,10 g	1,40 g	424 mg	0,1 mg
Fried egg	1,5 eggs	196	13,6 g	0,9 g	4,30 g	6,30 g	2,70 g	457 mg	0,2 mg
Karst prosciutto	100 g	250	28,6 g	3,6 g	7,14 g	0,00 g	0,00 g	107 mg	~
Lamb thigh	1 steak	185	19,0 g	0,0 g	4,90 g	4,70 g	0,90 g	67 mg	0,2 mg
Mortadella	100 g	311	16,4 g	3,0 g	9,50 g	11,40 g	3,10 g	56 mg	0,1 mg
Pork hot dog	1 pair	269	12,8 g	0,3 g	8,70 g	10,90 g	2,20 g	66 mg	0,3 mg
Pork liver	100 g	134	21,4 g	2,5 g	1,20 g	0,50 g	0,90 g	301 mg	0,7 mg
Pork, shoulder	100 g	236	17,2 g	0,0 g	6,20 g	8,00 g	1,90 g	71 mg	0,3 mg
Rabbit meat	100 g	136	20,0 g	0,0 g	1,70 g	1,50 g	1,10 g	57 mg	0,5 mg
Rabbit, wild	100 g	114	21,8 g	0,0 g	0,70 g	0,60 g	0,50 g	81 mg	~
Roast horse meat	100 g	175	28,1 g	0,0 g	1,90 g	2,10 g	0,90 g	68 mg	0,3 mg
Scrambled eggs	1 egg	167	11,1 g	2,2 g	3,70 g	4,80 g	2,10 g	352 mg	0,1 mg
Turkey	1 steak	160	20,4 g	0,0 g	2,30 g	2,90 g	2,00 g	68 mg	0,4 mg
Turkey hot dog	1 pair	233	12,2 g	3,8 g	4,00 g	5,70 g	3,90 g	77 mg	0,1 mg
Turkey liver	100 g	228	17,8 g	2,3 g	5,50 g	7,40 g	1,70 g	331 mg	1,5 mg

**MEAT AND REPLACEMENTS**

<i>B9</i>	<i>B12</i>	<i>D</i>	<i>C</i>	<i>E</i>	<i>Iron</i>	<i>Potassium</i>	<i>Selenium</i>	<i>Calcium</i>	<i>Magnesium</i>	<i>Manganese</i>	<i>Sodium</i>	<i>Zinc</i>
11 mcg	1,5 mcg	~	0 mg	0,40 mg	1,7 mg	327 mg	24,8 mcg	20 mg	22 mg	0,0 mg	56 mg	4,80 mg
13 mcg	1,6 mcg	~	0 mg	0,30 mg	2,0 mg	362 mg	29,2 mcg	20 mg	25 mg	0,0 mg	61 mg	4,30 mg
588 mcg	16,6 mcg	0,0 mcg	18 mg	0,70 mg	9,0 mg	230 mg	54,0 mcg	8 mg	19 mg	0,3 mg	71 mg	2,70 mg
10 mcg	0,4 mcg	0,0 mcg	0 mg	0,30 mg	1,0 mg	231 mg	13,5 mcg	10 mg	24 mg	0,0 mg	86 mg	0,00 mg
3 mcg	0,7 mcg	~	0 mg	0,30 mg	1,4 mg	386 mg	19,5 mcg	8 mg	21 mg	0,0 mg	969 mg	2,60 mg
4 mcg	6,3 mcg	~	0 mg	0,20 mg	3,4 mg	318 mg	9,7 mcg	5 mg	23 mg	0,0 mg	51 mg	2,10 mg
31 mcg	0,5 mcg	~	7 mg	~	2,6 mg	420 mg	16,8 mcg	13 mg	24 mg	0,0 mg	87 mg	2,30 mg
44 mcg	1,1 mcg	2,9 mcg	0 mg	1,00 mg	1,2 mg	126 mg	30,8 mcg	50 mg	10 mg	0,0 mg	124 mg	1,05 mg
51 mcg	1,4 mcg	3,1 mcg	0 mg	1,20 mg	2,0 mg	147 mg	34,2 mcg	59 mg	13 mg	0,0 mg	204 mg	1,40 mg
~	~	~	0 mg	~	1,9 mg	510 mg	16,7 mcg	0 mg	38 mg	0,0 mg	1714 mg	~
21 mcg	2,5 mcg	~	0 mg	~	1,7 mg	267 mg	21,9 mcg	7 mg	25 mg	0,0 mg	58 mg	4,70 mg
3 mcg	1,5 mcg	12,3 mcg	0 mg	0,20 mg	1,4 mg	163 mg	22,6 mcg	18 mg	11 mg	0,0 mg	1246 mg	2,10 mg
3 mcg	0,5 mcg	~	2 mg	~	3,7 mg	264 mg	27,8 mcg	267 mg	15 mg	0,0 mg	816 mg	2,02 mg
212 mcg	26,0 mcg	~	25 mg	0,60 mg	23,3 mg	273 mg	52,7 mcg	9 mg	18 mg	0,3 mg	87 mg	5,80 mg
5 mcg	0,7 mcg	6,6 mcg	1 mg	0,20 mg	1,1 mg	302 mg	25,5 mcg	15 mg	18 mg	0,0 mg	65 mg	2,70 mg
8 mcg	7,2 mcg	~	0 mg	~	1,6 mg	330 mg	23,7 mcg	13 mg	19 mg	0,0 mg	41 mg	1,60 mg
~	~	~	0 mg	~	3,2 mg	378 mg	9,4 mcg	12 mg	29 mg	~	50 mg	~
~	3,2 mcg	~	2 mg	~	5,0 mg	379 mg	13,5 mcg	8 mg	25 mg	0,0 mg	55 mg	3,80 mg
30 mcg	0,8 mcg	14,4 mcg	0 mg	1,10 mg	1,2 mg	138 mg	22,5 mcg	71 mg	12 mg	0,0 mg	280 mg	1,00 mg
8 mcg	0,4 mcg	~	0 mg	0,40 mg	1,4 mg	266 mg	24,4 mcg	15 mg	22 mg	0,0 mg	65 mg	1,30 mg
9 mcg	0,8 mcg	6,9 mcg	0 mg	0,60 mg	1,5 mg	392 mg	15,1 mcg	148 mg	14 mg	0,0 mg	1078 mg	~
677 mcg	49,4 mcg	~	25 mg	0,10 mg	12,0 mg	255 mg	70,8 mcg	5 mg	15 mg	0,2 mg	71 mg	3,40 mg

\*1 cup = 2 dl

\*1 teaspoon = 5 ml

\*1 tablespoon = 15 ml

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