

ActiveChoice™

YOUR HEALTH & WELLBEING FOCUS ON
FITNESS AND ATHLETIC PERFORMANCE

Speed *versus* Endurance
VO2 max and Aerobic Capacity
Injury Prevention



GENETIC PROFILE ID # 0000000

POWERED BY



Name: Sample Client

Kit: 0-000-000-0

Your Personal Genetic Profile



In this report, you will identify key genes which may influence your fitness and athletic performance. In particular, we detail your genetic variants that influence your ability to respond to power-related and endurance-based exercises, VO2 max and aerobic capacity, and predisposition to injuries. This information, combined with other assessments, can be used by an accredited health practitioner to design more personalised and targeted exercise and other lifestyle recommendations.

In order to simplify the results, the genes tested as part of your personal profile have been grouped in the following categories:

1. **Speed *versus* Endurance**
2. **VO2 max and Aerobic Capacity**
3. **Injury Prevention**

For each gene or grouping, you can have three different results, as shown by the figure below.

Beneficial

One or both of the genes in the pair contributes to the normal healthy functioning of the gene product.

Less Beneficial

One of the genes in the pair is contributing to a situation that impairs the healthy functioning of the gene product.

Least Beneficial

Both of the genes in the pair are contributing to a situation that impairs healthy functioning of the gene product.

For categories that have multiple genes, your risk for a particular condition will be increased with the more orange (slightly increased) or red (further increased) results you have. Similarly, if you only have green results, your risk will not be increased based on the genes included in this report.

If you have any worry or concern about a particular category or result, or if there is anything you do not understand, we encourage you to speak to your health practitioner.

Scientific Note: when comparing results from Fitgenes with other sources, it is important to take into account whether testing was done on the forward or reverse strand. For this reason, it is possible that results do not completely match, but they are still the same (C=G, A=T). Caution should be taking with complementary changes (C>G, A>T).

Disclaimer and limitations: all genes and variants presented in this report, with their corresponding implications for your health, have gone through extensive scientific literature review. Nevertheless, genetic research is rapidly increasing, and our understanding of the information included in this report will increase over time, and so the content of future reports may vary from this one.



Fitness and Athletic Performance

Fitness and athletic performance are influenced by the body's ability to efficiently deliver oxygen and nutrients to muscles while removing waste products. The cardiovascular and respiratory systems facilitate the transport of oxygen and nutrients through the bloodstream, playing a crucial role in this process. Growing evidence has found a relationship between genetic variations and athletic performance and/or susceptibility to develop sport-related injuries. In particular, genes can impact factors such as muscle fibre composition, oxygen-carrying capacity, and response to training.

While genetics can provide useful information, it's essential to remember that environmental factors, training, and dedication also play a significant role in an individual's overall fitness and athletic performance.

SPEED VERSUS ENDURANCE

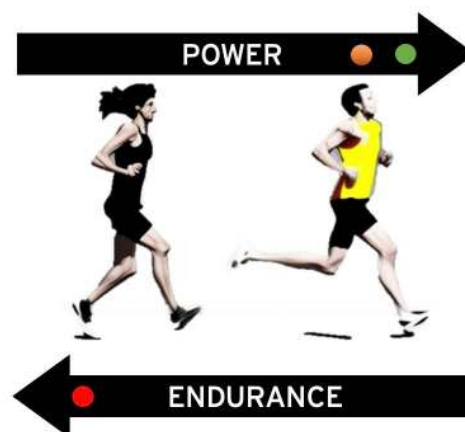
Gene (variant)	Description of the encoded molecule	Your Result			
ACTN3 (rs1815739)	Encodes alpha-actinin-3, which produces powerful contractions in glycolytic type II skeletal muscle fibres. People with a C result (green and orange as displayed here) are more likely to be sprinters and have more muscle strength and power, while the TT result (red) is associated with endurance athletes but less muscle strength. These results also have implications for metabolic health (see diagram below).	CC			

→ **General Interventions:** If you have a green or orange result (fast twitch or fast/intermediate twitch fibers, respectively), you might be most suited at high intensity training/high-load low-repetition resistance training, sprinting, and power sports. The effect of this genotype is additive, therefore green dot carriers have a higher power ability than orange carriers, who are the most versatile.

If you have a red result (slow twitch fibers), you might be most suited at endurance style training/low load with high repetitions and long-distance running, with a focus on preparation strategies to build muscle strength and recovery.

Always follow advice from your healthcare professional.

- More common genotype among elite power athletes (sprinters, weightlifting)
- Greater maintenance of muscle strength and function
- Increased bone mineral density
- Potential decreased risk of metabolic health related issues (insulin resistance, HDL-C)



- More common genotype among endurance athletes (marathon running), however this genotype has also been associated with higher risk of exercise-induced muscle damage
- Decreased muscle strength and function
- Decreased bone mineral density
- Potential increased risk of metabolic health related issues (insulin resistance, HDL-C)

VO2 MAX AND AEROBIC CAPACITY

VO2 max, or maximal oxygen consumption, is defined as the maximum amount of oxygen that an individual can use during intense exercise. Oxygen is delivered to peripheral organs, such as the skeletal muscle, where it is used to sustain muscular contraction. A higher VO2 max is considered an indicator of better cardiorespiratory fitness and aerobic capacity as well as mitochondrial function, and correlates with basal glycogen synthase activity allowing for a greater storage of glucose as glycogen, which accounts for the largest proportion of muscle glucose metabolism.



Cardiorespiratory fitness is, in turn, a predictor of chronic disease risk, and it is generally recommended to implement training programs to improve your VO2 max with the aim of reducing your risk of chronic diseases.

Gene (variant)	Description of the encoded molecule	Your Result			
AMPD1 (rs17602729)	Encodes the adenosine monophosphate deaminase enzyme, found in skeletal muscles, producing energy. Orange dot and particularly red dot indicate decreased enzyme activity and susceptibility to premature fatigue during exercise and muscular cramps, pain and weakness after exercise. A green dot is a marker of sprint and power performance.	GG			
VEGFA (rs2010963)	Has a role in permeabilization of blood vessels which drives ability to deliver small molecules and oxygen through vessel walls. Orange dot and particularly red dot indicate lower protein levels and decreased aerobic capacity. A green dot is more prevalent among endurance athletes and associated with higher aerobic performance and more efficient aerobic metabolism.	GG			
HIF-1a (rs11549465)	Regulates the expression of genes involved in angiogenesis and glucose metabolism by increasing the expression of hypoxia-induced genes. Orange dot and particularly red dot indicate decreased transcriptional activity and impaired glucose metabolism, leading to lower training response. A green dot, although rare, is more prevalent among power-based athletes like weightlifters and wrestlers, and indicates improved VO2 max during and after training.	CC			
ACSL1 (rs6552828)	Long-chain acyl CoA synthetase 1. Plays an important role in fatty acid metabolism and triacylglycerol synthesis. This gene is a marker of a person's ability to improve their VO2 max through exercise. Orange dot and particularly red dot indicate reduced VO2 max response to exercise. A green dot is a marker of increased VO2 max response.	GA			

→ **General Interventions:** If you have several of these orange or red variations, consider implementing strategies to boost your VO2 max and aerobic capacity. These include:

- cardio activities (swimming, running, biking, jump roping, burpees, etc.);
- regular exercise;
- high-intensity training;
- reduced-exertion HIIT;
- training in intervals;
- combining interval with strength and long endurance training;
- and challenging yourself while having enough recovery time,

all following advice from your healthcare professional.

OTHER GENES IMPACTING VO2 MAX AND AEROBIC CAPACITY

There are other genes in the Health & Wellbeing report whose results are also relevant to fitness and athletic performance, particularly affecting VO2 max, aerobic capacity, and mitochondrial function, as explained below:

Gene (variant)	Description of the encoded molecule	Your Result			
PPAR γ C1A (rs8192678)	This gene, which affects mitochondrial function, is involved in muscle fibre-type conversion towards slow-twitch type I fibres containing more mitochondria. Orange dot and particularly red dot indicate decreased transcriptional activity, VO2 max and mitochondrial function. A green dot is a marker of mitochondrial function.	GA			
PPAR γ (rs1801282)	This gene is involved in fat metabolism. Orange dot and particularly red dot indicate a potentially lesser weight loss in response to training. A green dot is the most favourable indicator of weight loss benefit in response to training.	CC			
ACE (rs4343)	This gene is associated with cardiovascular health. Orange dot and particularly red dot indicate a potentially decreased cardiovascular fitness. A green dot is an indicator of cardiovascular fitness likely due to an increase in the heart rate and muscle growth during exercise.	ID			
eNOS3-2 (rs1799983)	This gene affects the production of nitric oxide whose most important function is vasodilation, increasing blood flow and lowering blood pressure, and whose levels are correlated with triglyceride levels. Orange dot and particularly red dot indicate decreased nitric oxide levels, which translates to attenuated non-exercising muscle vasodilation and lower reduction in blood triglyceride levels in response to exercise. A green dot indicates increased nitric oxide levels, higher power/sprint ability and potentially lower blood triglyceride levels with exercise.	GT			
ADRB2 (rs1042714)	These genes affect the transport of oxygen and utilisation of fat and energy during exercise. Orange dot and particularly red dot indicate a potentially decreased aerobic capacity and VO2 max. A green dot is an indicator of a more efficient aerobic capacity and increase in VO2 max.	GG			
ADRB3 (rs4994)		TT			
UCP1 (rs1800592)	These genes affect the mitochondrial respiratory capacity. Orange dot and particularly red dot indicate a potentially decreased energy metabolism and aerobic capacity. A green dot is an indicator of increased energy metabolism and aerobic capacity.	AA			
UCP2 (rs659366)		TT			
UCP3-2 (rs1800849)		GG			

→ **General Interventions:** If you have several of these orange or red variations, consider implementing strategies to boost your VO2 max and aerobic capacity. These include:

- cardio activities (swimming, running, biking, jump roping, burpees, etc.);
- regular exercise;
- high-intensity training;
- reduced-exertion HIIT;
- training in intervals;
- combining interval with strength and long endurance training;
- and challenging yourself while having enough recovery time,

all following advice from your healthcare professional.

INJURY PREVENTION

The genetics of injury risk and prevention are complex, and have gained popularity in the realm of sports and physical performance. Certain genetic variations can predispose individuals to higher risk of specific injuries, for example those involving joint stability or connective tissue integrity.

Understanding these variations can be useful to implement training programs to mitigate any risks, with a focus on injury prevention strategies and recovery protocols, ultimately enhancing long-term athletic performance and overall health and wellbeing.

Gene (variant)	Description of the encoded molecule	Your Result			
COL5A1 (rs12722)	Encode collagen components, which strengthens and supports many tissues in the body, including skin, ligaments, bones, tendons, and muscles. Orange dot and particularly red dot indicate increased risk of musculoskeletal soft tissue injuries, and/or less flexibility and agility. A green dot result has a protective role.	TT			
COL1A1 (rs1800012)		GG			
VDR (rs1544410)	This gene affects vitamin D metabolism. Orange dot and particularly red dot indicate a potentially increased risk of low bone mineral density and fractures. A green dot is an indicator of bone mineral density and reduced risk of fractures.	GG			
VDR-2 (rs731236)		TT			
IL-6 (rs1800795)	These genes are involved in the inflammatory response. Orange dot and particularly red dot indicate a potentially increased risk of exercise-induced inflammation and muscle injury causing raised blood creatine kinase levels, and therefore delayed-onset muscle soreness and benefit from extended recovery and rest time between training sessions. A green dot is an indicator of the anti-inflammatory effects of exercise and reduced risk of exercise-induced muscle injury.	GC			
TNFα (rs1800629)		GA			

→ **General Interventions:** If you have several of these orange or red variations, consider implementing strategies to reduce your risk of injuries and supporting your body. These include:

- exercise-based neuromuscular training used as a warm-up before athletic activities;
- pre-exercise warm-up and post-exercise cool-down;
- more targeted and specific strength training programs;
- individualised load management practices with reduced running volumes;
- activities incorporating balance, agility, flexibility, strengthening, and plyometric exercises;
- post-exercise recovery strategies (swimming, yoga, stretching sessions, walking, saunas, cold plunges, etc.);
- and diet and supplements for injury prevention (carbohydrates and protein, alkaline foods, calcium and vitamin D, collagen-based products, creatine monohydrate, inositol, etc.),

all following advice from your healthcare professional.

Your Personal Genetic Profile Summary

GENETIC PROFILE ID: 0-000-000-0

This report has been designed to identify any of your variants in key genes that may influence your fitness and athletic performance. We encourage you to speak to your health practitioner if you have any concern about a particular category.

Beneficial

One or both of the alleles in the gene pair contribute to the normal healthy functioning of the gene product.

Less Beneficial

One of the alleles in the gene pair is contributing to a situation that impairs the healthy functioning of the gene product.

Least Beneficial

Both of the alleles in the gene pair are contributing to a situation that impairs the healthy functioning of the gene product.

#	Gene	rsID	Your Result			
Speed versus Endurance						
1	ACTN3	rs1815739	CC	●		
VO2 max and Aerobic Capacity						
2	AMPD1	rs17602729	GG	●		
3	VEGfα	rs2010963	GG			●
4	HIF-1α	rs11549465	CC	●		
5	ACSL1	rs6552828	GA		●	
Other genes impacting VO2 max and Aerobic Capacity						
6	PPARγC1A	rs8192678	GA		●	
7	PPARγ	rs1801282	CC	●		
8	ACE	rs4343	I/D		●	
9	eNOS3-2	rs1799983	GT		●	
10	ADRB2	rs1042714	GG			●
11	ADRB3	rs4994	TT	●		
12	UCP1	rs1800592	AA	●		
13	UCP2	rs659366	TT	●		
14	UCP3-2	rs1800849	GG			●
Injury Prevention						
15	COL5A1	rs12722	TT			●
16	COL1A1	rs1800012	GG			●
17	VDR	rs1544410	GG			●
18	VDR-2	rs731236	TT			●
19	IL-6	rs1800795	GC		●	
20	TNFα	rs1800629	GA		●	

ALL GENE-SPECIFIC REFERENCES CAN BE FOUND IN PRACWARE

Key References

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Your DNA journey
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