

Training Response (Fitness)

Biohacker Report

REPORT CATEGORY —



Sample Client

Report date: 15 January 2026

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DISCLAIMER

This report does not diagnose this or any other health conditions. Please talk to a healthcare professional if this condition runs in your family, you think you might have this condition, or you have any concerns about your results.

Personal information

NAME

Sample Client

SEX AT BIRTH

Male

HEIGHT

5ft 5" 165cm

WEIGHT

137lb 62kg



How this works

Our Wellness Reports analyze how your DNA influences your health.
We then use this analysis to give you personalized risk estimates and recommendations.



Similarly, our Trait Reports look at how your DNA influences your traits.



Your DNA is like an instruction manual — it contains a lot of information.
You can think of it as a blueprint for your body.

Genetic variants are parts of DNA that differ from person to person. Some can make you more vulnerable to certain health issues, while others may influence traits such as eye color.



We use artificial intelligence and machine learning to analyze all this information.
We then summarize your results as a risk score or display it on a gauge.

In total, we analyze up to 83 million genetic variants.

When we give a risk score, the risk icon tells you if you are at a higher or lower risk compared to other people:



Genotype color info:

AA

You don't have any risk alleles

AA

You have 1 risk allele

AA

You have 2 risk alleles

Your risk is also displayed as a percentile. This will tell you how your risks compare to our sample population. The lower your percentile number, the lower your risk. The "50th percentile" would be an average risk.

Similarly, the gauge tells you your relative risk score compared to our sample population, or it indicates a specific trait or haplotype you are more likely to have based on your genetic variants.

When applicable, we also list top evidence-based recommendations that may help lower your risk. The focus is on recommendations that may be of benefit to you, based on your genetics.

Our recommendations come in four categories: lifestyle, diet, supplements and drugs.
The following icons tell you which category a recommendation falls into:



Our team of scientists also ranks each recommendation.
We rank based on impact and the strength of evidence in the medical literature.

Impact shows how strongly a recommendation will affect your health in a certain area.
Evidence is how much scientific support there is for the recommendation. Rankings are from 1 to 5 (low to high):



Impact

Impact scores range from 1-5. These scores reflect how much of an effect each recommendation can have. An impact score of 5 predicts the biggest effect.

When a recommendation affects something we can measure, we use those measurements to assign the impact score. For example, a recommendation that decreases cholesterol by 20% will have a higher impact score than one that decreases it by 5%.

Some recommendations affect things that we cannot directly measure, like stress or mood. For these, the impact score is based on how well they work relative to other recommendations and standard treatments. The best ones get the highest scores.

If there is a lot of research that shows a recommendation works especially well for your genotype, the impact score gets increased.

Recommendation Evidence

5 / 5

Recommendations that are considered effective and generally recommended by experts and medical bodies.

4 / 5

Recommendations that are considered likely effective and that have multiple independent meta-analyses and a great many studies supporting them.

3 / 5

Recommendations that are considered possibly effective and have many studies supporting them

2 / 5

Recommendations that have insufficient evidence, with two or several clinical trials supporting them, or many studies but with ambiguous results.

1 / 5

Recommendations that have insufficient evidence, with a single clinical trial, or with many studies most of which didn't find support for the recommendation.

0 / 5

No evidence in humans.

Genotype-specific Evidence

High-quality

Direct evidence that a recommendation helps more in people with your gene variant (many clinical trials, a few large clinical trials, or a meta-analysis).

Medium-quality

Direct evidence that a recommendation helps more in people with your gene variant (a few clinical trials or one large clinical trial).

Low-quality

Direct evidence that a recommendation helps more in people with your gene variant (a single clinical trial or more trials with inconsistent results).

Indirect

A recommendation may help more in people with your gene variant because it targets a specific gene or protein affected by your variant (e.g., MTHFR, dopamine).

In theory

A recommendation may help more in people with your gene variant because it targets a specific mechanism affected by your variant (e.g., inflammation, oxidative stress).

Some things to keep in mind:

- Genetics doesn’t play a considerable role in a condition or a trait.
- There is not enough research available to estimate a genetic predisposition.
- There are technical limitations to estimating or presenting a genetic predisposition.
- The topic is sensitive, and a genetic predisposition should only be estimated and presented by a healthcare professional.

Introduction

Genetics plays a crucial role in determining an individual’s baseline fitness level and their response to aerobic training. A key measure of fitness response is **VO2 max**, which represents the maximum amount of oxygen the body can utilize during intense exercise.

Higher VO2 max levels indicate greater aerobic fitness, associated with a reduced risk of cardiovascular disease and an improved quality of life.

For those with genetic predispositions that impact training response, understanding these factors can help optimize workout plans to improve endurance, performance in aerobic activities, and overall health.

Genetics

Several genetic variants are associated with the body’s response to aerobic training and its ability to improve VO2 max, endurance, and overall fitness levels:

ACE (rs4343, Ins/Del): The ACE gene influences cardiovascular function and muscle efficiency. The insertion/deletion (Ins/Del) variant in ACE can affect endurance potential, with the insertion allele associated with improved aerobic capacity and endurance performance.

AMPD1 (rs17602729, 133 C>T): AMPD1 encodes an enzyme involved in muscle energy metabolism. The rs17602729 variant (133 C>T) can impact the efficiency of energy production during exercise, potentially influencing endurance and recovery.

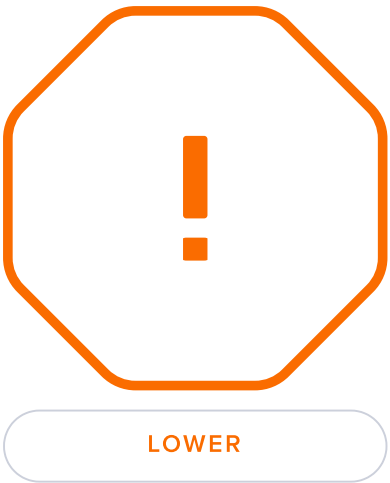
CKM (rs8111989, NcoI T>C): The CKM gene is involved in muscle energy storage and utilization. The rs8111989 variant (NcoI T>C) affects the enzyme creatine kinase, which plays a role in quick energy release for high-intensity exercise, impacting strength and endurance performance.

PPARGC1A (rs8192678, Gly482Ser G>A): Known as PGC-1α, this gene regulates mitochondrial biogenesis and energy metabolism. The rs8192678 variant (Gly482Ser G>A) influences aerobic endurance and VO2 max, making it a key factor in exercise response and stamina.

ACSL1 (rs6552828, T>C): ACSL1 plays a role in fatty acid metabolism, which is crucial for endurance exercise. The rs6552828 variant (T>C) affects the body’s ability to utilize fats for fuel, impacting endurance and overall aerobic efficiency.

GSTP1 (rs1695, Ile105Val A>G): The GSTP1 gene is involved in detoxification processes and oxidative stress management. The rs1695 variant (Ile105Val A>G) can influence recovery and resilience to exercise-induced oxidative damage, affecting endurance and performance.

HIF1A (rs11549465, Pro582Ser C>T): HIF1A regulates the body’s response to oxygen levels, which is vital during aerobic exercise. The rs11549465 variant (Pro582Ser C>T) can affect the body’s adaptation to low oxygen during



Lower potential for fitness improvement from training based on 9 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
ACE	rs4343	AA
HIF1A	rs11549465	CC
GSTP1	rs1695	AA
NFE2L2	rs35652124	TT
ACSL1	rs6552828	AA
VEGFA	rs2010963	GG
CKM	rs8111989	CT
PPARGC1A	rs8192678	TC
AMPD1	rs17602729	GG

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

endurance activities, influencing VO2 max and exercise capacity.

NRF2/NFE2L2 (rs35652124, A>G): NRF2 controls antioxidant responses and cellular defense mechanisms. The rs35652124 variant (A>G) can impact recovery and resilience to oxidative stress, which is crucial for sustained performance in endurance sports.

VEGF (rs2010963, -634 G>C): VEGF is involved in blood vessel formation and oxygen delivery to muscles. The rs2010963 variant (-634 G>C) affects vascularization and muscle oxygenation, influencing endurance capacity and training response.

These genetic factors, combined with lifestyle and training choices, shape individual fitness levels and training response. Understanding these genetic influences can help create a more personalized approach to exercise, improving endurance, cardiovascular health, and overall fitness outcomes.

Your Recommendations

Your recommendations are prioritized according to the likelihood of it having an impact for you based on your genetics, along with the amount of scientific evidence supporting the recommendation.

You'll likely find common healthy recommendations at the top of the list because they are often the most impactful and most researched.

DOSAGE		DOSAGE	
1	Cycling	2	Zumba1 hour
3	High-Impact Exercise30 minutes	4	Running
5	Avoid Rapid Weight Changes	6	Aerobic Exercise (Cardio)1 hour
7	Endurance Training1 hour		

1



Cycling

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Begin cycling with moderate rides to build up your stamina, targeting 2 to 4 times a week for 30 to 60 minutes per session. Ensure your bicycle is the right size and properly adjusted for your comfort. Safety gear, including helmets, is essential. Mix up your routes for interest and challenge, and consider joining a cycling group for social and motivational benefits. Maintenance of your bicycle will ensure a smooth ride and prolong its life.

Description

Cycling is a low-impact, environmentally friendly exercise that offers significant cardiovascular benefits, muscle strengthening, and flexibility improvement. It's suitable for all fitness levels and can be enjoyed both recreationally and competitively. Cycling promotes weight loss, decreases stress levels, and improves joint mobility. It's also a convenient mode of transportation that encourages outdoor exploration and reduces air pollution.

How it helps

Cycling significantly improves cardiovascular efficiency and strengthens lower body muscles, contributing to enhanced endurance and stamina needed for achieving fitness goals. This aerobic exercise facilitates improved oxygen delivery and utilization in the muscles, optimizing overall training response.

2



Zumba

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Participate in a Zumba class at least 3 times per week for a duration of one hour each session. Choose a class appropriate for your fitness level to ensure safety and effectiveness.

TYPICAL STARTING DOSE

1 hour

Description

Zumba is a fitness program that combines dance and aerobic movements set to energetic music. It's popular for its potential to improve cardiovascular fitness, coordination, and overall physical health through a fun and engaging workout.

How it helps

Zumba improves cardiovascular fitness by elevating heart rate, thus enhancing aerobic capacity and overall stamina. This dynamic workout also promotes coordination and agility, making it an effective exercise option for those with specific fitness goals.

3

High-Impact Exercise

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Engage in high-impact exercises like jogging, skipping rope, or playing sports such as basketball or volleyball for at least 30 minutes, 3 to 4 times a week. Ensure to include a warm-up and cool-down period of 5 to 10 minutes to prevent injuries.

TYPICAL STARTING DOSE

30 minutes

Description

High-impact exercise, such as running or jumping, can help improve cardiovascular fitness, bone density, and overall strength. It's an effective way to burn calories and promote physical health when performed safely and in moderation.

How it helps

High-impact exercise enhances cardiovascular fitness and maximizes aerobic capacity by challenging the body at varied intensities, promoting greater adaptation and performance improvements. This approach aids in optimizing training response for individuals looking to elevate their fitness levels.

4

Running

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

To implement running into your routine, start with shorter distances and gradually increase as your endurance improves. Aim for 3 to 5 sessions per week, each lasting 20 to 30 minutes. Wear appropriate running shoes to prevent injuries and choose varied routes to keep the activity engaging. Incorporate warm-up exercises before running and cool down with stretches afterward to enhance flexibility and recovery.

Description

Running is a versatile and accessible form of aerobic exercise that improves cardiovascular health, strengthens muscles, and enhances mental well-being. It requires minimal equipment, can be done almost anywhere, and is effective for weight management. Regular running can increase endurance, reduce stress, and boost overall physical fitness, making it a popular choice for maintaining an active lifestyle.

How it helps

Running enhances cardiovascular efficiency and increases oxygen uptake, which directly contributes to higher VO2 max levels. This improvement supports overall fitness development and optimizes training responses in individuals seeking to enhance their athletic performance.

5



Avoid Rapid Weight Changes

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Maintain a consistent, healthy weight by avoiding extreme dieting or sudden increases in food intake. Aim for gradual weight changes, not exceeding 1-2 pounds per week, by adjusting your diet and physical activity levels accordingly. This approach should be sustained over a long-term period to ensure health and prevent potential adverse effects on the body.

Description

Avoiding extreme and rapid weight changes, whether through crash diets or excessive calorie restriction, is essential for preventing negative health consequences such as nutritional deficiencies and metabolic disruptions.

Your weight is determined by the number of calories you consume compared to those you burn. Changes in exercise frequency, amount and type of food consumed, and alcohol intake may alter your energy expenditure. This may cause small weight fluctuations [\[R\]](#).

Some people may gain or lose weight at a faster rate. Rapid weight fluctuations may be due to [\[R\]](#), [\[R\]](#):

- Very drastic diets
- Water retention or dehydration
- Hormonal changes
- Pregnancy
- Taking certain medications
- Certain health conditions

How it helps

Avoiding rapid weight changes promotes metabolic stability and nutritional balance, which are crucial for maintaining energy levels and optimizing athletic performance during training.

6



Aerobic Exercise (Cardio)

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Engage in at least 150 minutes of moderate-intensity aerobic exercise or 75 minutes of vigorous-intensity activity each week. Distribute this time over at least 3 days per week, avoiding consecutive days of vigorous exercise to allow for recovery.

TYPICAL STARTING DOSE

1 hour

Description

Engaging in regular aerobic exercise, such as running, swimming, or cycling, offers numerous health benefits, including improved cardiovascular fitness, weight management, and mood enhancement. It supports overall physical and mental well-being while reducing the risk of chronic diseases.

Cardio, short for cardiovascular exercise, is any type of physical activity that temporarily increases your heart rate. Examples include **running, cycling, swimming, and brisk walking**.

Regular cardio exercise has many benefits for your overall health. It can help lower your risk of heart disease and diabetes, support weight loss, and improve your mood and energy levels. To get the most out of cardio, try to do it for at **least 30 minutes, 3-5 times a week**.

Interval training is a type of cardio that combines periods of high-intensity training with brief rest periods.

How it helps

Aerobic exercise enhances cardiovascular efficiency and increases VO2 max, aligning with the individual's fitness goals and genetic predispositions. This improvement in endurance is crucial for optimizing overall training response and achieving peak physical performance.

7



Endurance Training

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Engage in activities like running, swimming, or cycling for 60 minutes at a moderate intensity (or 30 minutes high-intensity), 3 to 5 days a week. To achieve significant benefits, maintain this regimen for at least 12 weeks.

TYPICAL STARTING DOSE

1 hour

Description

Endurance training is any type of exercise that helps you perform over a long period of time. It can improve your cardiovascular health, reduce your risk of chronic diseases, and improve your mental health.

How it helps

Endurance training enhances cardiovascular efficiency by increasing the heart's stroke volume and optimizing oxygen utilization in muscles, which aligns with genetic predispositions for improved aerobic performance.